



REPORT

In Situ Chemical Oxidation Pilot Test

216 Paterson Plank Road Site Carlstadt, NJ

Submitted to:

USEPA

290 Broadway, 19th Floor
New York, New York
10007-1866

Submitted by:

Golder Associates Inc.

200 Century Parkway, Suite C Mt. Laurel, New Jersey, USA 08054

+1 856 793-2005

943-6222

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1.0 INTRODUCTION

On behalf of the 216 Paterson Plank Road Cooperating PRP Group (Group), this report presents the results of the In-Situ Chemical Oxidation (ISCO) Pilot Test for the Southern Area of Operable Unit 3 (OU-3) at the 216 Paterson Plank Road Site (Site¹) in Carlstadt, New Jersey (Figure 1).

On September 27, 2012, the United States Environmental Protection Agency (USEPA) issued a Record of Decision (ROD) (USEPA, 2012) for OU-3 identifying the selected remedy that addresses Site-related impacts to deep groundwater in the glacial deposits and bedrock. OU-3 is the final operable unit for the Site and follows the interim measures implemented under OU-1 and the final remedy for soils and shallow groundwater addressed as OU-2. As such, the OU-3 remedy is expected to complement the source control and treatment measures included as part of OU-1 and OU-2 so as to achieve the Site-wide remedial action objectives. Subsequently, USEPA entered into a Consent Decree for OU-3 (CD) with the Group that was lodged on November 6, 2013 and addresses the implementation of the OU-3 remedial design and remedial action.

The OU-3 remedy includes the following components (USEPA, 2012):

- Active treatment of contaminated off-property and deep groundwater using in situ treatment technologies, through the injection of a substance or substances into the aquifer materials to cause or enhance the breakdown of the groundwater contaminants of concern to less toxic forms
- Monitored natural attenuation both during and after active treatment
- Institutional controls to assure that the remedy remains protective until cleanup goals are achieved

As described in the approved Remedial Design Work Plan (Golder, 2014), design and implementation of the OU-3 remedy for the Northern and Southern Areas are being addressed separately. The Southern Area remedy is required to address 1,4 dioxane and additional investigation to refine the extent of impacts was conducted in April and May 2015. Pilot testing of in-situ chemical oxidation (ISCO) using sodium persulfate with alkaline (NaOH) activation was subsequently undertaken to assess the effectiveness of treatment and collect design information. The Pilot Test was completed in accordance with the approved Southern Area Pilot Test Work Plan presented in the Pre-Design Investigation Report (Golder, 2016) and a Permit by Rule Equivalency issued by the New Jersey Department of Environmental Protection (NJDEP) on April 3, 2017.

This report presents the results of the pilot test and design recommendations for the Southern Area remedy.

1.1 Description of Property

The 6-acre 216 Paterson Plank Road property (Figure 2) is a former chemical recycling and waste processing facility, which ceased operation in 1980, and is located in a light industrial/commercial area of Carlstadt, New Jersey. The property is bordered to the southwest by Paterson Plank Road, to the northwest by Gotham Parkway, to the southeast by a trucking company, and to the northeast by Peach Island Creek. The Site was placed on USEPA's National Priorities List (NPL) in 1983. The Site has been the subject of extensive investigations as described in the Final Off-Property Groundwater Investigation Report (Golder, 2008). A summary of the geology, hydrogeology and the general nature and extent of contaminants is provided in the following sections.

¹ The Site is also referred to as the former Scientific Chemical Processing Site or SCP Site. The Site includes the 216 Paterson Plank Road property and related off-property groundwater impacts.

1.2 Site Geology

The stratigraphy at the Site consists of the following units, from youngest to oldest:

- Man-Made Fill
- Marine and Marsh Sediments
- Glaciolacustrine Varved Deposits
- Glacial Till
- Bedrock

The geologic units that are relevant to OU-3 include the Glaciolacustrine Varved Unit, which serves as a confining unit, and the underlying Glacial Till and Bedrock Units. Based on previous investigations, these units are described in detail in the following sections. A cross-section through the pilot test area is shown in Figure 3.

1.2.1 Glaciolacustrine Varved Unit

The glaciolacustrine varved unit at the Site can be correlated with the varved silts and silty clays of Glacial Lake Hackensack, although the lower portions may belong to the Glacial Lake Bayonne stage (see Stanford and Harper, 1991). This unit has been broadly subdivided into the following horizons:

- An upper, stiff to medium stiff, bedded, varved horizon, which is significantly sandier than the lower horizon. This horizon also displays distinct banding with stringers and intercalations of silty sand and silt.
- A lower, very soft to soft, highly plastic clayey horizon. This horizon consists of a clayey silt to massive clay, wherein the varved nature is more difficult to recognize because of the higher clay content.

The glaciolacustrine unit ranges in thickness from zero (MW-33D) to over 20 feet. The geotechnical properties, particularly the standard penetration test (SPT) blow counts, are distinctly different between the two horizons. SPT blow counts in the lower horizon are generally below 2 blows/foot. The upper horizon is generally stiffer, with blow counts as high as 28, indicating a generally coarser texture with intercalated seams of silt and sand, and possibly desiccation (see Averill et al. 1980; Harris, 1972).

1.2.2 Glacial Till Unit (Soft Till and Lodgement Till)

Informally correlated with the Rahway Till (Stanford et al, 1994), this unit consists of a heterogeneous mixture of red, yellow-brown, reddish-brown, and reddish-gray clay, silt, sand, and gravel. At most locations, a softer glacial till has been recognized to overlie a much harder, over-consolidated glacial till. The over-consolidated lower glacial till is a distinct horizon that is characteristic of a basal, lodgement till (Lutenegegen et al. 1983; Averill et al. 1980) and is generally continuous across the Site. SPT blow counts are generally greater than 50 in the basal lodgement till. The softer till displays significantly lower blow counts, typically 20 to 30. Based on the above observations, the glacial tills beneath the Site can be subdivided as follows:

- The upper horizon, herein informally called the Soft Till, ranging in thickness from 0 to 17 feet; and
- The over-consolidated lower horizon, called the Lodgement Till, ranging in thickness from 0 to 30 feet.

The Lodgement Till displays a composition similar to the underlying bedrock, with clasts entirely composed of the underlying siltstone or sandstone, set in a clayey silt or silty clay matrix. In the Soft Till, however, the clasts may also include metamorphic rock fragments such as quartzite and gneiss and occasional well-rounded to sub-rounded quartzite gravel.

1.2.3 Bedrock Unit

The bedrock beneath the Site area has been assigned to the siltstone-mudstone-sandstone facies of the Passaic Formation (Parker, 1994) and has been intercepted by numerous boreholes including core-holes that have been sampled and logged. Bedrock consists of fining-upward sequences of intercalated massive siltstone and mudstone and laminated siltstone with occasional interbeds of micaceous, fine to medium grained sandstone. The bedrock is brick red, reddish brown or brown in color, and this coloration dominates all overlying glacial deposits. Rhythmic cycles of gray bed sequences 10 to 20 feet thick, or "Van Houten Cycles" (Olsen, 1980) occur sporadically throughout the lower portions of the core samples.

The regional strike trend of the Passaic strata in northern New Jersey is northeasterly with a northwesterly dip. Joints measured in sparse outcrops in this portion of Bergen County trend N10°E and N65°W and are sub-vertical and vertical in orientation and parallel with bedrock strike and sub-parallel with the dip direction, respectively. Very few vertical fractures have been intercepted in boreholes although a few steeply dipping fractures were intercepted by the core-holes. Much of the observed bedrock discontinuities were bedding plane partings or dissolution enhanced, vuggy intervals of reddish siltstone and mudstone. Some of the vugs are infilled with secondary minerals. Occasionally fractures at angles with the bedding plane have also been intercepted. Bedrock bedding plane dips in this part of the Weehawken Quadrangle are gentle, and generally range from 15 degrees to 10 degrees northwesterly. In all the rock cores collected, bedding plane dips were determined to be essentially sub-horizontal.

1.3 Glacial Till and Bedrock Hydrogeology

Previous Site investigations have included multiple rounds of continuous water level monitoring of several till and bedrock monitoring wells as well as monitoring of surface water levels in Peach Island Creek. Hydrogeologic testing (packer and slug) was also performed on six (6) till monitoring wells and four (4) bedrock monitoring wells. Relevant results from these studies (Golder, 1997; 2003) are summarized below:

- Water levels in both the till and bedrock units are influenced by commercial extraction wells located north of the property that operate during the week and are idle on the weekends
- Flow direction in the till and bedrock varies due to the above referenced extraction well operations, combined with the low natural hydraulic gradients, but is generally towards the northwest.
- Approximately 12-hour (tidal) fluctuations were observed in several of the till monitoring wells and all bedrock monitoring wells but tidal influences do not appear to affect the predominant groundwater flow direction.
- Horizontal hydraulic gradients in both the till and bedrock range between approximately 0.001 ft/ft and 0.0008 ft/ft with higher gradients associated with periods when off-property commercial pumping is active.
- Hydrogeologic testing indicates till hydraulic conductivities range from 3.2×10^{-6} centimeters per second (cm/s) at location MW-10D, to 7.1×10^{-4} cm/s at location MW-16D with a geometric mean value of 7.0×10^{-5} cm/s. The bedrock hydraulic conductivities range from 3.1×10^{-5} cm/s at location MW-8R, to 1.2×10^{-2} cm/s at location MW-11R with a geometric mean value of 4.3×10^{-4} cm/s.

1.4 Southern Area Impacts

Groundwater impacts in the southern area of OU-3 consists primarily of 1,4-dioxane. Aquifer profile borings in 2009, 2011 and 2015 (Golder, 2010, 2012 & 2016) have established that 1,4-dioxane impacts are limited to the till (particularly the shallower soft till) and the highest 1,4-dioxane concentrations occur within a relatively narrow zone parallel to Paterson Plank Road (Figure 2). In-situ chemical oxidation (ISCO) was identified as the most

appropriate treatment approach for 1,4-dioxane in the southern area groundwater during the Feasibility Study (Golder, 2012).

2.0 FIELDWORK ACTIVITIES

2.1 Overview of Field Activities

The pilot test objectives included the following:

- Installation of one (1) injection well and three (3) additional monitoring wells
- Establish baseline groundwater concentrations by sampling
- Establish deliverability of amendment to the subsurface
- Assess amendment consumption in the subsurface
- Evaluate radius of influence (ROI) of an injection point
- Evaluate appropriate amendment dosage
- Assess potential site physical constraints
- Assess treatment efficiency
- Evaluate potential rebound of 1,4-dioxane concentration
- Provide information for full-scale remedial design (oxidant dosage, catalyst dosage, etc.)

Drilling was conducted by Summit Drilling, of Bridgewater, New Jersey, a New Jersey licensed drilling firm. All utilities were marked-out prior to mobilization and cleared using soft dig methods. Surveying was conducted by MPF Land Surveying of Montville, New Jersey. Laboratory analyses were performed by Test America (Edison, New Jersey and Burlington, Vermont) laboratories. All field work was conducted in accordance with the Site Health and Safety Plan.

Containers of solid investigation derived waste (IDW drill cuttings and PPE) were staged on-Site, characterized as non-hazardous and disposed in accordance with USEPA guidance (USEPA, 1992). IDW (purge, development, and decontamination water) were added to the on-Site groundwater collection system tank and disposed off-site.

2.2 Well Installation

The pilot test design included one (1) new injection well (IP16-2), three (3) existing monitoring wells (MW-21D, MW-22D, and MW-21R), and three new till monitoring wells (MP16-1, MP16-2, and MP16-3). The pilot test location was selected based on the consistent high levels of 1,4-dioxane measured in MW-21D and MW-22D, and the higher concentrations of 1,4-dioxane in the soft till compared to the lodgement till. The well spacing was based on the Northern Area Enhanced Anaerobic Bioremediation (EAB) pilot test, which suggested a radius of influence of greater than 15-feet may be achievable. Locations were selected to make efficient use of existing wells and were adjusted slightly in the field based on access limitations.

The wells were installed using standard drilling methods as described in the Field Sampling and Analysis Plan (FSAP) and included Hollow Stem Auger (HSA) methods to install an 8-inch permanent steel casing into the varved clay to case off shallow groundwater. Borings were then progressed inside the steel casing by rotosonic drilling methods, advancing a 4-inch core barrel and 6-inch override casing. Continuous soil cores were collected

in 5-foot intervals and logged until the desired depth was reached. New monitoring well MP16-03 was installed within the lodgement till (46 to 56 feet below ground surface [bgs]) and was installed first to guide the final depths for the other new wells. IP16-2, MP16-1, and MP16-2 were screened at the bottom of the soft till (approximately 35 to 45 feet bgs). All wells were constructed of 2-inch schedule 40 PVC with 10-foot (No. 10 slot) screen. The monitoring wells were completed as flushmounts to accommodate property usage.

In the area of the pilot test, the soft till was a little over 23 feet thick, thicker than previously described, and the lodgement till approximately 15 feet thick. Between the soft till and the lodgement till, a thin (1.5 to 3-foot thick) clay layer was logged in MW-21R and soil borings B09-1, B09-2, and B09-3 (Figure 3).

The ISCO pilot test well layout is shown in Figure 2 and well construction information is provided in Table 1. Well logs, Form A's, Form B's, and well development forms are included in Appendix A.

2.3 Hydraulic Testing

Limited recharge was observed in IP16-2 and MP16-1 during well development activities. To evaluate hydraulic conductivity, the pilot test wells were slug tested in December 2016. The results of the slug tests (Table 3) indicate hydraulic conductivities ranging from 1.0×10^{-5} cm/sec (MW-21R) to 1.8×10^{-4} cm/sec (MP16-3).

A Bromide Tracer test was implemented in March 2017 in order to evaluate the hydraulic connectivity between the injection well and the proposed monitoring wells ahead of proceeding with amendment injections. Approximately 2.6 kg of potassium bromide (KBr) was added to approximately 100 gallons of potable water and injected into IP16-2. Ion-selective electrodes and pressure transducers were installed in MW-22D, MP16-1, MP16-2, and MP16-3 to monitor pressure and the bromide tracer and a pressure transducer was also installed in MW-21D. As illustrated in Figures 4 and 5, there was a strong pressure response in MW-21D (screened higher in the soft till) and MP16-3 (screened below the soft till in the lodgement till). A slightly lower pressure response was observed in MP16-2, followed by MP16-1 and MW-22D (located approximately 41 feet from IP16-2). This pressure response indicates a hydraulic connection between the injection well and these monitoring wells. An increase in the bromide concentrations was observed in MP16-1, and MP16-3. No response was seen in MP16-2 or MW-22D during the time the bromide transducers were deployed. These results suggested a radius of influence for injected amendments on the order of 10 feet.

2.4 Groundwater Sampling

Samples were collected from each pilot test well for target compound list VOCs, 1,4-dioxane, metals (including hexavalent chromium), and select conventional parameters (alkalinity, ferric and ferrous iron, total iron, nitrogen, and total organic carbon). All wells were purged and sampled using low-flow methods. Field parameters, including specific conductivity, dissolved oxygen, oxidation reduction potential, pH, temperature, and ferrous iron were also monitored during purging and immediately prior to sampling and the results are presented in Table 2.

Baseline samples for the ISCO pilot test were collected in December 2016 and monitoring samples were collected in July 2017, September 2017, January 2018², and May 2018 and the analytical results are provided in Table 4.

2.5 Injection Activities

An initial injection of sodium persulfate and sodium hydroxide in IP16-2 was performed between June 27, 2017 and June 29, 2017. As described in the work plan (Golder, 2016) an approximately 20% by weight solution of sodium persulfate was used. An injectant mass of 4,408 lbs of sodium persulfate was calculated considering the

² MW-21 was not sampled during this event as it was inaccessible beneath a snow pile

natural oxidant demand measured in the Bench Scale tests. Persulfate was mixed and injected in batches in 250-gallon totes using 358 pounds sodium persulfate in 238 gallons of potable water. The sodium persulfate and sodium hydroxide were mixed in-line in an injection manifold (with check valves and other safety features), and introduced into the subsurface through the injection point.

The injection backpressure was monitored at both the injection manifold and the well head. Injections pressures were less than 20 pounds per square inch (psi) at both the manifold and the well head and a consistent flow rate of approximately 5 gallons per minute (gpm) was achieved. In total, 4,408 pounds of sodium persulfate, 1,100 gallons of 25% sodium hydroxide and 3,050 gallons of potable water were injected in June 2017.

Following the injection, field parameters, including a persulfate test were measured in the injection and monitoring wells daily for one week, and then weekly until the next injection (Table 5). Elevated pH values (>10) were recorded in the injection well (IP16-2), and in three monitoring wells, MP16-1, MP16-2, and MP16-3. Elevated pH levels in MP16-2, approximately 20 feet from the injection well, suggested a radius of influence of approximately 20 feet. Elevated pH levels were not sustained further from the injection well, indicating that the injection was under-dosed.

Based on initial rebound observed in MP16-2 in September 2017, the second injection of sodium persulfate and sodium hydroxide was performed on December 4 through December 7, 2017. In total, 8,265 pounds of sodium persulfate, 1,800 gallons of 25% sodium hydroxide and 5,500 gallons of potable water were injected in this event. Post injection monitoring indicated that the necessary alkaline conditions were not sustained following this injection event and a further injection of sodium hydroxide solution only was made in MP16-2 on January 10, 2018 (1,500 gallons of 25% sodium hydroxide and 100 gallons of potable water). pH levels in IP16-1 and MP16-2 were elevated following the injection and pH levels in MW-22D increased (approximately 2 units) following the third injection. Table 6 presents the injection quantities and rates for all 3 injection events.

3.0 PILOT TEST RESULTS

The analytical results for 1,4-dioxane from the baseline sampling and subsequent groundwater monitoring sampling are shown in Figure 6.

Baseline samples in the till indicated initial 1,4-dioxane concentrations ranging from 160 µg/L in MP16-3, screened in the lodgement till, to 4,600 µg/L in MW-21D, consistent with previous sampling in the area (Table 4).

Samples collected in August 2017 one month following initial injections in July 2017 showed a decline in 1,4-dioxane concentrations including:

- Concentrations declined 95% in the injection well IP16-2 (2,500 µg/L to 120 µg/L).
- Concentrations in MP16-1³, located approximately 10 feet from the injection well, declined 43% (610 µg/L to 360 µg/L).
- Concentrations in MP16-2, located approximately 20 feet from the injection well, declined 53% (1,600 µg/L to 760 µg/L).
- There were also slight decreases in concentrations in wells further from the injection point:

³ This well had the lowest hydraulic conductivity of all the till wells

- Concentrations in MW-21D, which is located approximately 15 feet from the injection well and screened approximately 15 feet *above* the injection interval, dropped 20% (4,600 µg/L to 3,700 µg/L).
- Concentrations in MW-22D, which is located approximately from the injection well, 41 feet dropped 15% (740 µg/L to 630 µg/L).

As expected, there was no response in MW-21R, screened in bedrock, which continued to have very low level detections of 1,4-dioxane. There was also no response in MP16-3, screened in the lodgement till, 10 feet below the injection interval, and which had initial 1,4-dioxane concentrations approximately an order of magnitude lower than the other wells. No mobilization of metals, including hexavalent chromium, was observed.

Results from the September 2017 sampling event (2 months following injection) indicated that concentrations of 1,4-dioxane had continued to decline in the injection well to 12 µg/L (99.5%). A rebound to 1,400 µg/L (still 12% below baseline) was observed in monitoring well MP16-2, and no significant changes were observed in the other monitoring wells.

A second injection was conducted in December 2017. Post-injection monitoring of field parameters did not show the anticipated increase in pH necessary for persulfate activation, and therefore a separate injection of sodium hydroxide alone was conducted in January 2018.

Samples collected in January 2018 following the second and third injections indicated:

- 1,4-dioxane concentrations remained low in injection well IP16-2 (19 µg/L)
- 1,4-dioxane concentrations in MP16-2, located approximately 20 feet from the injection, well declined to 930 µg/L (42% below baseline)
- There was no clear response to the second injection in terms of 1,4-dioxane concentrations in MP16-1, located approximately 10 feet from the injected well, as was seen with the first injection.
- There was no increase in pH in MP16-1 after the third sodium hydroxide injection.
- There was a slight spike in the pH in MW-22D following the second injection, and a steady increase in pH occurred following the third, sodium hydroxide only, injection.
- There was a brief increase in the persulfate field measurement in MP16-3 after the second injection.

Once again there was no mobilization of metals following the second and third injection events.

Analytical results from the last sampling event in May 2018 indicated:

- No rebound in IP16-2, which continued to decline to 5.3 µg/L (99.8% drop from baseline)
- Concentrations dropped to approximately 50% of baseline in MW-21D
- The concentration of 1,4-dioxane remained at approximately 50% that of baseline in MP16-1 and 90% of baseline in MW-22D.
- Rebound was observed in MP16-2, roughly to baseline levels.

Overall, there was no mobilization of metals; hexavalent chromium was only detected twice, both in the injection well shortly after injections when the pH >13, and it was not detected in later sampling events.

4.0 CONCLUSIONS

Conclusions from this pilot test include:

- **Treatment was >99% effective for 1,4-dioxane in the injection well and the first injection resulted in ~50% reductions in wells up to 20 feet away.** As the injectate mass and volumes were calculated assuming a radius of influence of 15 feet, the rebound observed in the monitoring well ~20 feet from the injection well (MP16-2) indicates the dose was insufficient to treat the increased distance from the injection well. The increase in pH in MW-22D after the second, larger volume, injection and the different pH response generally to the second injection suggests greater propagation with the larger volume injection and/or the possibility that the distribution of injectant varied between injections (alkaline activated persulfate has been observed to decrease permeability, Watts, 2011). Based on the highly effective destruction with the initial injection, aggressive dosing in the first injections is recommended during full-scale implementation.
- **Reductions of 1,4-dioxane (on the order of 50%) were observed in wells located ~10 and ~20 feet away from the injection well.** This suggests that well spacing of 15-20 feet is appropriate. It is expected that, similar to the Northern Area Remedial Design, a phased approach will be used to refine the spacing and dosing during treatment.
- **Reductions of 1,4-dioxane (on the order of 50%) were observed in MW-21D during the last monitoring event⁴.** This is somewhat unexpected given this well is screened higher in the till than the injection well and demonstrated only modest (~20%) reductions in the sampling events after the first injection. Since this well showed no clear pH response to any injection, it seems unlikely that direct treatment occurred; rather this concentration response may reflect migration of upgradient groundwater treated by the first injection (MW-21D had the strongest pressure response to the bromide tracer injection, and is hydraulically well connected to the injection well).
- **No rebound has yet been observed in any well other than MP16-2.** Additional samples will be collected from IP16-2, MP16-1, and MW-21D in two additional sampling events during 2018 (coordinated with progress monitoring sampling associated with the Northern Area Remedial Action) to further evaluate rebound. The lack of extensive rebound indicates that supplemental injection events, if necessary, will be spaced more than 6 months apart.
- **There was no mobilization of metals.**

The information gained from the pilot test provides sufficient data to proceed with the design of the selected remedy in the southern area and indicates that a phased implementation approach is appropriate to maximize the efficiency and effectiveness of the remedy.

Since the Feasibility Study (Golder, 2012), was completed, which recommended in situ chemical oxidation in the southern area, new information and approaches to treating 1,4-dioxane have become available. An increasing body of published literature, including work by Golder (Gedalanga et al., 2016), indicates that biodegradation of 1,4-dioxane is possible via metabolic (bacteria metabolizing 1,4-dioxane for energy gain) and co-metabolic processes (enzymes produced by bacteria during consumption of growth substrates fortuitously degrade 1,4-dioxane). Golder has demonstrated, at another site, via bench-scale and pilot tests, that biodegradation of 1,4-dioxane can be accelerated by the addition of alkane gases, oxygen and nutrients. Samples will be collected from MW-22D, where there was little influence from the pilot test, and 1,4-dioxane concentrations remain elevated (670

⁴ MW-21 was not sampled during this event as it was inaccessible beneath a snow pile

µg/L), to evaluate the potential for biodegradation at this Site. This work will be completed in parallel with the design of the ISCO remedy.

5.0 REFERENCES

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Table 1
Well Construction
216 Paterson Plank NPL Site
Carlstadt, NJ

WELL ID	DATE OF COMPLETION	GROUND SURFACE ELEVATION (FT-MSL)	ELEVATION TOP OF INNER CASING (FT-MSL)	WELL DIAMETER & MATERIAL(S)	WELL SCREEN (FT BGS)	SCREEN LENGTH (FT)	SCREENED INTERVAL FORMATION
ISCO INJECTION AND MONITORING WELLS							
IP16-2	11/1/2016	5.50	5.03	2-INCH PVC	35-45	10	TILL
MP16-1	11/2/2018	5.50	5.08	2-INCH PVC	35-45	10	TILL
MP16-2	11/2/2016	5.60	5.08	2-INCH PVC	36-46	10	TILL
MP16-3	10/31/2016	5.60	5.12	2-INCH PVC	46-56	10	TILL
MW-21D	9/18/1998	5.80	5.56	4-INCH SS	21-28.2	7.2	TILL
MW-22D	9/3/2002	6.77	6.41	4-INCH SS	32-42	10	TILL
MW-21R	12/22/2009	5.70	5.47	2-INCH PVC	74.5-84.5	10	BEDROCK

Ground surface elevations provided by surveyor.

MW-22D surveyed by James M. Stewart November 20, 2002

MW-21D surveyed by MPF Land Surveying, LLC on December 8, 2015

New wells IP16-2, MP16-1, MP16-2, and MP16-3 surveyed by MPF Land Surveying, LLC on June 27, 2017

made by: HAL
 Checked by: JWJ 8/1/18

Table 2
 Groundwater Field Parameters
 216 Paterson Plank NPL Site
 Carlstadt, NJ

Well ID	Date Sampled	Dissolved Oxygen mg/L	Oxidation Reduction Potential millivolts	pH SU	Specific Conductance ms/cm	Temperature deg C	Turbidity ntu
IP16-2	12/12/2016	0	-167	13.01	12.2	13.85	27
MP16-1	12/12/2016	0	57	8.56	3.4	15.03	32.9
MP16-3	12/13/2016	0.7	-115	7.9	2.02	15.7	6.1
MW-21D	12/13/2016	0	-108	5.54	4.04	15.78	16.8
MW-21R	12/13/2016	0	-153	8.18	0.71	14.12	56.2
MW-22D	12/13/2016	0	-263	6.65	3.21	13.56	12.2
MP16-2	12/15/2016	0	-150	7.75	4.41	14.9	26.9
MP16-3	7/25/2017	0	80	7.92	3.58	17.76	14.1
IP16-2	7/25/2017	43.03	177	13.09	61.9	19.46	107
MP16-2	7/25/2017	0	145	9.58	4.64	20.75	16.2
MP16-1	7/25/2017	0	166	10.45	6.94	20.21	35.7
MW-21D	7/25/2017	0	72	6.67	14.3	19.73	24.6
MW-21R	7/25/2017	0	28	8.46	1.38	20.93	74.4
MW-22D	7/27/2017	0	-202	8.21	8.63	19.12	11.8
MP16-2	9/14/2017	3.29	-113	7.8	4.38	19.99	0
IP16-2	9/14/2017	1.67	-203	12.63	19.1	18.31	101
MP16-3	9/14/2017	0	-143	7.92	2.42	17.64	7.5
MP16-1	9/14/2017	0	178	8.39	2.8	25.15	9.2
MW-21R	9/14/2017	0.31	-119	7.71	0.891	17.21	2.2
MW-22D	9/14/2017	0.51	-244	7.91	6.03	20.29	0
MW-21D	9/14/2017	1.63	-47	6.52	8.76	20	2
MP16-1	1/18/2018	6.17	89	8.47	4.44	10.54	464
MW-21R	1/18/2018	0	-39	8.04	1.14	12.54	22
MP16-3	1/18/2018	0	-100	8.01	2.25	14.8	29.8
IP16-2	1/18/2018	50	146	13.62	86.2	14.3	40.2
MP16-2	1/18/2018	0	-167	14	0	13.43	174
MW-22D	1/19/2018	0	-142	7.96	5.89	13.14	6.8
MP16-1	5/14/2018	1.85	46	8.3	3.62	20.96	78.5
IP16-2	5/14/2018	0.51	-147	12.35	13.1	17.52	27.1
MP16-3	5/15/2018	0	-67	7.94	2.67	17.9	27.5
MP16-2	5/15/2018	0	-207	13.38	49.7	20.17	85.5
MW-21R	5/15/2018	0	-118	8.06	1.31	19.17	7.2
MW-21D	5/16/2018	0	-30	6.96	9.16	16.75	6.6
MW-22D	5/16/2018	0	-138	7.92	6.45	16.31	12.4

made by: AZ 8/1/18

checked by: VRR 8/9/18

Abbreviations:

mg/L - milligrams per liter

ms/cm - millisiemens per centimeter

ntu - nephelometric turbidity units

Table 3
Summary of Slug Test Results
216 Paterson Plank Road Site
Carlstadt, NJ

Well	Test	Analysis	Hydraulic Conductivity	
			K (cm/sec)	K (ft/d)
IP16-2	Falling Head	Bouwer & Rice	2.22E-05	0.063
IP16-2	Rising Head	Bouwer & Rice	4.73E-05	0.134
MP16-1	Rising Head - 1	Bouwer & Rice	1.72E-05	0.049
MP16-1	Rising Head - 2	Bouwer & Rice	2.14E-05	0.061
MW-22D	Falling Head	Bouwer & Rice	8.45E-05	0.239
MW-22D	Rising Head	Bouwer & Rice	6.90E-05	0.196
MW-21D	Falling Head	Bouwer & Rice	1.31E-04	0.372
MW-21D	Rising Head	Bouwer & Rice	1.35E-04	0.382
MW-21R	Falling Head	Bouwer & Rice	9.94E-06	0.028
MW-21R	Rising Head	Bouwer & Rice	1.53E-05	0.044
MP16-2	Falling Head	Bouwer & Rice	3.53E-05	0.100
MP16-2	Rising Head	Bouwer & Rice	3.71E-05	0.105
MP16-3	Falling Head	Bouwer & Rice	1.80E-04	0.510
MP16-3	Rising Head	Bouwer & Rice	1.56E-04	0.442

Made by
 Slug tests reviewed by
 Table checked by

HAL 2/27/17
 BG 2/27/17
 CD 3/17/17

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate		IP16-2 12/12/2016 N			IP16-2 7/25/2017 FD			IP16-2 7/25/2017 N			IP16-2 9/14/2017 N			IP16-2 1/18/2018 FD			IP16-2 1/18/2018 N			IP16-2 5/14/2018 N			MP16-1 12/12/2016 N							
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	
Volatile Organic Compounds																														
1,1,1-Trichloroethane	ug/L	30	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	0.67	J	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,1,2,2-Tetrachloroethane	ug/L	1	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,1,2-Trichloroethane	ug/L	3	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,1-Dichloroethane	ug/L	50	1.8	J	0.5	0.85	J	2.5	0.77	J	2.5	< 13	U	13	< 10	U	10	< 10	U	10	3.9	2.5	< 0.5	U	0.5	< 0.5	U	0.5		
1,1-Dichloroethene	ug/L	1	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	UJ	0.5	
1,2,3-Trichlorobenzene	ug/L	NS	< 0.5	UJ	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	R	10	< 10	R	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,2,4-Trichlorobenzene	ug/L	9	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,2-Dibromo-3-chloropropane	ug/L	0.02	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,2-Dibromoethane	ug/L	0.03	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,2-Dichlorobenzene	ug/L	600	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,2-Dichloroethane	ug/L	2	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,2-Dichloropropane	ug/L	1	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,3-Dichlorobenzene	ug/L	600	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
1,4-Dichlorobenzene	ug/L	75	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
2-Butanone	ug/L	300	24	J	5	< 25	UJ	25	78	J	25	< 130	U	130	78	J	100	85	J	100	< 25	U	25	420	55	23	5			
2-Hexanone	ug/L	40	< 5	R	5	< 25	U	25	< 25	U	25	< 130	U	130	< 100	U	100	< 100	U	100	< 25	U	25	< 5	U	5	< 5	U	5	
4-Methyl-2-pentanone	ug/L	NS	< 5	R	5	< 25	U	25	< 25	U	25	< 130	U	130	< 100	U	100	< 100	U	100	< 25	U	25	< 5	U	5	< 5	U	5	
Acetone	ug/L	6000	43	J	5	690		25	610		25	< 200	U	200	350		100	430		100	110		25	68		5	57	5		
Benzene	ug/L	1	1.7	J	0.5	11		2.5	10		2.5	10	J	13	5.5	J	10	6.5	J	10	17		2.5	< 0.5	U	0.5	1.2	0.5		
Bromochloromethane	ug/L	NS	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
Bromodichloromethane	ug/L	1	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
Bromoform	ug/L	4	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
Bromomethane	ug/L	10	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5	
Carbon Disulfide	ug/L	700	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	2.1	J	2.5	0.45	J	0.5	1.5	0.5		
Carbon Tetrachloride	ug/L	1	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.	

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate		IP16-2 12/12/2016 N			IP16-2 7/25/2017 FD			IP16-2 7/25/2017 N			IP16-2 9/14/2017 N			IP16-2 1/18/2018 FD			IP16-2 1/18/2018 N			IP16-2 5/14/2018 N			MP16-1 12/12/2016 N						
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL			
Toluene	ug/L	600	0.69	J	0.5	0.93	J	2.5	0.93	J	2.5	6.7	J	13	< 10	U	10	< 10	U	10	59	2.5	0.58	0.5	< 0.5	U	0.5		
trans-1,2-Dichloroethene	ug/L	100	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	UJ	0.5
trans-1,3-Dichloropropene	ug/L	1	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5
Trichloroethylene	ug/L	1	4	J	0.5	19		2.5	18		2.5	< 13	U	13	54	J	10	43	J	10	16		2.5	< 0.5	U	0.5	< 0.5	U	0.5
Trichlorofluoromethane	ug/L	2000	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	< 2.5	U	2.5	< 0.5	U	0.5	< 0.5	U	0.5
Vinyl Chloride	ug/L	1	< 0.5	R	0.5	< 2.5	U	2.5	< 2.5	U	2.5	< 13	U	13	< 10	U	10	< 10	U	10	1.7	J	2.5	< 0.5	U	0.5	< 0.5	U	0.5
Semivolatile Organic Compounds																													
1,4-Dioxane	ug/L	0.4	2500		210	130		10	120		11	12		2.2	15	J	1.9	19	J	1.9	5.3		0.4	610		52	360		52
Total Metals																													
Aluminum	ug/L	200	NA			25000		200	23900		200	NA			NA			NA			4450		200	NA			52.9	J	200
Antimony	ug/L	6	NA			< 60	U	60	< 60	U	60	NA			NA			NA			3.8	J-	60	NA			< 60	U	60
Arsenic	ug/L	3	NA			792		10	770		10	NA			NA			NA			82.2		10	NA			< 10	U	10
Barium	ug/L	6000	NA			90.9	J	200	87.1	J	200	NA			NA			NA			29	J	200	NA			82.8	J	200
Beryllium	ug/L	1	NA			< 5	U	5	< 5	U	5	NA			NA			NA			0.11	J	5	NA			< 5	U	5
Cadmium	ug/L	4	NA			< 5	U	5	< 5	U	5	NA			NA			NA			3.2	J	5	NA			< 5	U	5
Calcium	ug/L	NS	NA			35800		5000	35400		5000	NA			NA			NA			24200		5000	NA			439000		10000
Chromium	ug/L	70	NA			587		10	573		10	NA			NA			NA			207		10	NA			40.2		10
Cobalt	ug/L	100	NA			7.6	J	50	6.4	J	50	NA			NA			NA			< 50	U	50	NA			< 50	U	50
Copper	ug/L	1300	NA			658		25	619		25	NA			NA			NA			1270		25	NA			20.4	J	25
Hexavalent Chromium	ug/L	NS	NA			< 10	U	10	13.1		10	< 100	U	100	< 10	U	10	< 10	U	10	NA						< 10	U	10
Iron	ug/L	300	NA			1620	J	100	636	J	100	NA			NA			NA			1950		100	NA			268		100
Lead	ug/L	5	NA			11.7	J	20	12	J	20	NA			NA			NA			136		10	NA			< 10	U	10
Magnesium	ug/L	NS	NA			4860	J	5000	4770	J	5000	NA			NA			NA			946	J	5000	NA			11700		5000
Manganese	ug/L	50	NA			93.3		15	85		15	NA			NA			NA			125		15	NA			14.9	J	15
Mercury	ug/L	2	NA			0.58		0.2	0.51		0.2	NA			NA			NA			5.9	J-	0.2	NA			< 0.2	U	0.2
Nickel	ug/L	100	NA			93.3		40	81.3		40	NA			NA			NA			56.8		40	NA			< 40	U	40
Potassium	ug/L	NS	NA			22400		5000	21700		5000	NA			NA			NA			12700		5000	NA			11400		5000
Selenium	ug/L	40	NA			79.7		35	75.5		35	NA			NA			NA			4.3	J	35	NA			< 35	U	35
Silver	ug/L	40	NA			1.6	J	10	0.94	J	10	NA			NA			NA			3.5	J	10	NA			< 10	U	10
Sodium	ug/L	50000	NA			12900000		1000000	12600000		1000000	NA			NA			NA			1720000		250000	NA			558000		40000
Thallium	ug/L	2	NA			< 25	U	25	< 25	U	25	NA			NA			NA			< 25	U	25	NA			< 25	U	25
Vanadium	ug/L	NS	NA			1200		50	1190		50	NA			NA			NA			150		50	NA			8.5	J	50
Zinc																													

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate		IP16-2 12/12/2016 N			IP16-2 7/25/2017 FD			IP16-2 7/25/2017 N			IP16-2 9/14/2017 N			IP16-2 1/18/2018 FD			IP16-2 1/18/2018 N			IP16-2 5/14/2018 N			MP16-1 12/12/2016 N						
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL			
Nickel	ug/L	100	5.1	J	40	NA			NA			134		40	15.9	J	40	16.1	J	40	51.1		40	< 40	U	40	NA		
Potassium	ug/L	NS	57800		5000	NA			NA			20300		5000	25200		5000	24800		5000	12300		5000	13400		5000	NA		
Selenium	ug/L	40	< 35	U	35	NA			NA			< 35	U	35	24.8	J	35	26.8	J	35	4.9	J	35	< 35	U	35	NA		
Silver	ug/L	40	< 10	U	10	NA			NA			< 10	U	10	0.45	J	10	< 10	U	10	< 10	U	10	< 10	U	10	NA		
Sodium	ug/L	50000	712000		40000	NA			NA			3590000		200000	12300000		1000000	11800000		1000000	1740000		125000	176000		20000	NA		
Thallium	ug/L	2	< 25	U	25	NA			NA			< 25	U	25	< 25	U	25	< 25	U	25	2.8	J	25	< 25	U	25	NA		
Vanadium	ug/L	NS	< 50	U	50	NA			NA			249		50	735		50	720		50	137		50	< 50	U	50	NA		
Zinc	ug/L	2000	8.6	J	60	NA			NA			63.3		60	1380		60	1350		60	46.4	J	60	6.9	J	60	NA		
General Chemistry Parameters																													
Alkalinity, Bicarbonate as CaCO ₃	mg/L	NS	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	15		5	< 5	U	5			
Alkalinity, Carbonate as CaCO ₃	mg/L	NS	73.2		5	3020	J	5	2420	J	5	833		5	2750		5	2300		5	802		5	< 5	U	5	35.1	5	
Alkalinity, Hydroxide (OH)	mg/L	NS	1440		5	2810		5	3110		5	1440		5	11600		5	11500		5	NA		< 5	U	5	6.2	5		
Alkalinity, Total	mg/L	NS	1510		5	5830		5	5530		5	2270		5	14300		5	13800		5	NA		17.4	5	41.3	J	5		
Carbon Dioxide	ug/L	NS	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	UJ	5000	< 5000	UJ	5000	< 5000	U	5000	< 5000	U	5000	U	5000	
Chloride	mg/L	250	2000		120	921	J	120	898	J	120	421	J+	30	686	J	60	79.5	J	13.2	NA		1140		120	1080	J	120	
Ferric Iron	mg/L	NS	0.38		0.1	1.4	J	0.1	1.8	J	0.1	14.2		0.1	1.6	J	0.1	1.2	J	0.1	1.1	J	0.1	0.2		0.1	0.85	0.1	
Ferrous Iron	mg/L	NS	< 0.1	UJ	0.1	0.046	J	0.1	0.016	J	0.1	0.7	J	0.1	0.13	J	0.1	0.1	J	0.1	0.89	J	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1
Iron	ug/L	300	377		150	1440	J	150	1850	J	150	14900		600	1680	J	150	1320	J	150	NA		195		150	846		150	
Nitrate as N	mg/L	10	< 0.1	UJ	0.1	NA			NA			NA			NA			NA			NA		< 0.1	UJ	0.1	NA			
Nitrite as N	mg/L	1	< 0.12	U	0.12	NA			NA			NA			NA			NA			NA		< 0.12	U	0.12	NA			
Nitrogen, Total Kjeldahl	mg/L	NS	1.4		0.2	NA			NA			NA			NA			NA			NA		0.21		0.2	NA			
Sulfate	mg/L	250	21.6		3	24100		600	23500		600	5490		150	15300	J	600	1550	J	66	1810		60	187		6	673	J	60
Sulfide	mg/L	NS	< 1	U	1	NA			NA			NA			NA			NA			NA		< 1	U	1	NA			
Total Organic Carbon	mg/L	NS	9.1		1	289		5	294		5	237		5	213		10	212		10	138		5	2.4		1	5.2		1

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate		MP16-1 9/14/2017 N			MP16-1 1/19/2018 N			MP16-1 5/15/2018 N			MP16-2 12/12/2016 N			MP16-2 7/25/2017 N			MP16-2 9/14/2017 N			MP16-2 1/18/2018 N			MP16-2 5/15/2018 N						
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL			
Volatile Organic Compounds																													
1,1,1-Trichloroethane	ug/L	30	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,1,2,2-Tetrachloroethane	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	R	0.5	< 0.5	U	0.5			
1,1,2-Trichloroethane	ug/L	3	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,1-Dichloroethane	ug/L	50	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	2.4		0.5	2.8		0.5	4.9		0.5	< 10	U	10	0.88	J-	0.5	< 0.5	U	0.5
1,1-Dichloroethene	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,2,3-Trichlorobenzene	ug/L	NS	< 0.5	U	0.5	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	R	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,2,4-Trichlorobenzene	ug/L	9	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,2-Dibromo-3-chloropropane	ug/L	0.02	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	R	0.5	< 0.5	U	0.5			
1,2-Dibromoethane	ug/L	0.03	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,2-Dichlorobenzene	ug/L	600	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,2-Dichloroethane	ug/L	2	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,2-Dichloropropane	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,3-Dichlorobenzene	ug/L	600	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
1,4-Dichlorobenzene	ug/L	75	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
2-Butanone	ug/L	300	< 6.9	U	6.9	< 5	U	5	< 5	U	5	3200		180	3.6	J	5	< 5	U	5	160		100	56	J-	5	< 5	U	5
2-Hexanone	ug/L	40	0.71	J	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	200		100	69	J-	5	< 5	U	5			
4-Methyl-2-pentanone	ug/L	NS	< 5	U	5	< 5	U	5	< 5	U	5	1.2	J	5	0.99	J	5	< 5	U	5	< 100	U	100	< 5	UJ	5	< 5	U	5
Acetone	ug/L	6000	23		5	< 5	U	5	< 5	U	5	690		180	23		5	< 5	U	5	33	J	100	33	J-	5	< 5	U	5
Benzene	ug/L	1	0.75		0.5	< 0.5	U	0.5	< 0.5	U	0.5	0.58		0.5	1.1		0.5	1.5		0.5	< 10	U	10	0.57		0.5	< 0.5	U	0.5
Bromochloromethane	ug/L	NS	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	R	0.5	< 0.5	U	0.5			
Bromodichloromethane	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
Bromoform	ug/L	4	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	R	0.5	< 0.5	U	0.5			
Bromomethane	ug/L	10	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
Carbon Disulfide	ug/L	700	1		0.5	< 0.5	U	0.5	< 0.5	U	0.5	0.2	J	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	0.91		0.5
Carbon Tetrachloride	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
Chlorobenzene	ug/L	50	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 10	U	10	< 0.5	U	0.5	< 0.5	U	0.5			
Chloroethane	ug/L	5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	0.35	J	0.5	< 10	U	10	< 0.5					

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate			MP16-1 9/14/2017 N			MP16-1 1/19/2018 N			MP16-1 5/15/2018 N			MP16-2 12/12/2016 N			MP16-2 7/25/2017 N			MP16-2 9/14/2017 N			MP16-2 1/18/2018 N			MP16-2 5/15/2018 N					
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL			
Nickel	ug/L	100	< 40	U	40	< 40	U	40	1.8	J	40	< 40	U	40	NA			< 40	U	40	< 200	U	200	12.1	J	40	3.5	J	40
Potassium	ug/L	NS	7620		5000	7200	J+	5000	5370		5000	17800		5000	NA			6980		5000	53300		5000	6050		5000	4750	J	5000
Selenium	ug/L	40	< 35	U	35	< 35	U	35	< 35	U	35	NA						< 35	U	35	10.6	J	35	5.4	J	35	< 35	U	35
Silver	ug/L	40	< 10	U	10	< 10	U	10	0.44	J	10	< 10	U	10	NA			< 10	U	10	0.68	J	10	< 10	U	10	< 10	U	10
Sodium	ug/L	50000	325000		20000	355000	J+	25000	251000		20000	450000		25000	NA			645000		40000	28700000		2000000	6250000		500000	102000		10000
Thallium	ug/L	2	< 25	U	25	< 25	U	25	< 25	U	25	< 25	U	25	NA			< 25	U	25	< 125	U	125	< 25	U	25	< 25	U	25
Vanadium	ug/L	NS	< 50	U	50	0.83	J	50	1.9	J	50	< 50	U	50	NA			< 50	U	50	2490		50	2680		50	5	J	50
Zinc	ug/L	2000	< 60	U	60	< 60	U	60	< 60	U	60	7.5	J	60	NA			28.3	J	60	148		60	< 60	U	60	< 60	U	60
General Chemistry Parameters																													
Alkalinity, Bicarbonate as CaCO ₃	mg/L	NS	32.1		5	29.9		5	31.5		5	96.1		5	38.2		5	84		5	< 5	U	5	< 5	U	5	25.3		5
Alkalinity, Carbonate as CaCO ₃	mg/L	NS	< 5	U	5	7.4		5	< 5	U	5	< 5	U	5	29.9		5	< 5	U	5	11000		5	2040		5	< 5	U	5
Alkalinity, Hydroxide (OH)	mg/L	NS	< 5	U	5	< 5	U	5	NA			< 5	U	5	< 5	U	5	< 5	U	5	52800		5	NA		< 5	U	5	
Alkalinity, Total	mg/L	NS	32.1		5	37.3		5	NA			96.1		5	68.1		5	84		5	63800		5	NA		25.3		5	
Carbon Dioxide	ug/L	NS	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	5300		5000	< 5000	U	5000	2700	J	5000	< 5000	UJ	5000	< 5000	U	5000	< 5000	U	5000
Chloride	mg/L	250	879	J+	120	551		48	NA			1170		60	1070	J	120	1140	J+	120	1680		60	NA			602	J-	24
Ferric Iron	mg/L	NS	2.2		0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	1.7		0.1	0.31		0.1	< 0.1	U	0.1	0.87	J	0.1	< 0.1	UJ	0.1	< 0.1	U	0.1
Ferrous Iron	mg/L	NS	< 0.1	UJ	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	0.031	J	0.1	< 0.1	UJ	0.1	< 0.2	UJ	0.2	0.1	J	0.1	0.059	J	0.1
Iron	ug/L	300	2190		150	< 150	U	150	NA			1700		150	341		150	105	J	150	1070		150	NA			< 150	U	150
Nitrate as N	mg/L	10	NA			NA		NA				< 0.1	UJ	0.1	NA			NA			NA		NA			< 0.1	U	0.1	
Nitrite as N	mg/L	1	NA			NA		NA				< 0.12	U	0.12	NA			NA			NA		NA			< 0.12	U	0.12	
Nitrogen, Total Kjeldahl	mg/L	NS	NA			NA		NA				0.27		0.2	NA			NA			NA		NA			< 0.2	U	0.2	
Sulfate	mg/L	250	615		60	1000		24	655		30	124		3	301	J	60	211		6	394		30	301		30	228	J-	12
Sulfide	mg/L	NS	NA			NA		NA				< 1	U	1	NA			NA			NA		NA			< 1	U	1	
Total Organic Carbon	mg/L	NS	3		1	2.1		1	2.1		1	6.6		1	10.1		1	4.6		1	12.5		10	8.8		5	1.3		1

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate		MP16-3 7/25/2017 N			MP16-3 9/14/2017 FD			MP16-3 9/14/2017 N			MP16-3 1/18/2018 N			MP16-3 5/15/2018 N			MW-21D 12/13/2016 N			MW-21D 7/25/2017 N			MW-21D 9/14/2017 N			MW-21D 5/16/2018 N			
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Volatile Organic Compounds																													
1,1,1-Trichloroethane	ug/L	30	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,1,2,2-Tetrachloroethane	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,1,2-Trichloroethane	ug/L	3	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,1-Dichloroethane	ug/L	50	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	13	J	0.5	21		2.5	19		0.5	300	J	13			
1,1-Dichloroethene	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,2,3-Trichlorobenzene	ug/L	NS	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	R	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13				
1,2,4-Trichlorobenzene	ug/L	9	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,2-Dibromo-3-chloropropane	ug/L	0.02	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,2-Dibromoethane	ug/L	0.03	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,2-Dichlorobenzene	ug/L	600	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,2-Dichloroethane	ug/L	2	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,2-Dichloropropane	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,3-Dichlorobenzene	ug/L	600	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
1,4-Dichlorobenzene	ug/L	75	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
2-Butanone	ug/L	300	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 25	U	25	< 5	U	5	< 130	R	130			
2-Hexanone	ug/L	40	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 25	U	25	< 5	U	5	< 130	R	130			
4-Methyl-2-pentanone	ug/L	NS	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 25	U	25	< 5	U	5	< 130	R	130			
Acetone	ug/L	6000	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 25	U	25	< 8.1	U	8.1	< 130	R	130			
Benzene	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	20	J	8.5	26		2.5	19		0.5	180	J	13			
Bromochloromethane	ug/L	NS	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Bromodichloromethane	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Bromoform	ug/L	4	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Bromomethane	ug/L	10	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Carbon Disulfide	ug/L	700	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Carbon Tetrachloride	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Chlorobenzene	ug/L	50	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Chloroethane	ug/L	5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	60	J	8.5	29		2.5	30		13	200	J	13			
Chloroform	ug/L	70	< 0.5</td																										

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Analytical Results
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Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate		MP16-3 7/25/2017 N			MP16-3 9/14/2017 FD			MP16-3 9/14/2017 N			MP16-3 1/18/2018 N			MP16-3 5/15/2018 N			MW-21D 12/13/2016 N			MW-21D 7/25/2017 N			MW-21D 9/14/2017 N			MW-21D 5/16/2018 N			
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Toluene	ug/L	600	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	0.21	J	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
trans-1,2-Dichloroethene	ug/L	100	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	0.76	U	0.5	< 13	R	13			
trans-1,3-Dichloropropene	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	0.071	J	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Trichloroethylene	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	2		0.5	7		2.5	9.6		0.5	110	J	13			
Trichlorofluoromethane	ug/L	2000	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 2.5	U	2.5	< 0.5	U	0.5	< 13	R	13			
Vinyl Chloride	ug/L	1	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	2.1		0.5	< 2.5	U	2.5	4.5		0.5	41	J	13			
Semivolatile Organic Compounds																													
1,4-Dioxane	ug/L	0.4	160		14	150	J	11	120	J	9	100		10	120		10	4600		420	3700		420	3700		450	2200	J	160
Total Metals																													
Aluminum	ug/L	200	< 200	U	200	NA			NA			807		200	< 200	U	200	< 200	U	200	NA			< 200	U	200			
Antimony	ug/L	6	< 60	U	60	NA			NA			< 60		60	< 60	U	60	< 60	U	60	NA			< 60	UJ	60			
Arsenic	ug/L	3	< 10	U	10	NA			NA			< 10		U	10	7	J	10	< 10	U	10	NA			2.7	J	10		
Barium	ug/L	6000	27.1	J	200	NA			NA			49.4		J	200	2680		200	310		200	NA			98.1	J	200		
Beryllium	ug/L	1	< 5	U	5	NA			NA			< 5		U	5	< 5	U	5	< 5	U	5	NA			< 5	U	5		
Cadmium	ug/L	4	< 5	U	5	NA			NA			0.27		J	5	< 5	U	5	1.3	J	5	NA			0.54	J	5		
Calcium	ug/L	NS	332000		10000	NA			NA			307000		10000	494000		10000	496000		10000	NA			441000		10000			
Chromium	ug/L	70	< 10	U	10	NA			NA			< 10		U	10	2.4	J	10	< 10	U	10	NA			< 10	U	10		
Cobalt	ug/L	100	< 50	U	50	NA			NA			< 50		U	50	< 50	U	50	1.4	J	50	NA			< 50	U	50		
Copper	ug/L	1300	4.9	J	25	NA			NA			19.9		J	25	8.4	J	25	16	J	25	NA			< 25	U	25		
Hexavalent Chromium	ug/L	NS	< 10	U	10	< 10	U	10	< 10	U	10	NA			NA			< 10	U	10	< 10	U	10	NA					
Iron	ug/L	300	69.9	J	100	NA			NA			1510		100	21400		100	2990		100	NA			10200		100			
Lead	ug/L	5	< 10	U	10	NA			NA			7.4		J	10	< 10	U	10	< 10	U	10	NA			< 10	U	10		
Magnesium	ug/L	NS	40100		5000	NA			NA			39600		5000	165000		5000	139000		5000	NA			140000		5000			
Manganese	ug/L	50	289		15	NA			NA			280		15	1670		15	2080		15	NA			1530		15			
Mercury	ug/L	2	< 0.2	U	0.2	NA			NA			< 0.2		UJ	0.2	< 0.2	U	0.2	< 0.2	U	0.2	NA			< 0.2	UJ	0.2		
Nickel	ug/L	100	< 40	U	40	NA			NA			8.5		J	40	6.4	J	40	63.6		40	NA			146	J	40		
Potassium	ug/L	NS	4670	J	5000	NA			NA			< 5000		U	5000	11600		5000	12200		5000	NA			9710		5000		
Selenium	ug/L	40	< 35	U	35	NA			NA			< 35		U	35	< 35	U	35	< 35	U	35	NA			< 35	U	35		
Silver	ug/L	40	< 10	U	10	NA			NA			< 10		U	10	< 10	U	10	< 10	U	10	NA			< 10	U	10		
Sodium	ug/L	50000	117000		10000	NA			NA			103000		10000	1110000		100000	1210000		100000	NA			1080000		125000			
Thallium	ug/L	2	< 25	U	25	NA			NA			< 25		U	25	< 25	U	25	< 25	U	25	NA			< 25	U	25		
Vanadium	ug/L	NS	9.6	J	50	NA			NA			10		J	50	< 50	U	50	< 50	U	50	NA			< 50	U	50		
Zinc	ug/L	2000	16	J	60</td																								

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate			MP16-3 7/25/2017 N			MP16-3 9/14/2017 FD			MP16-3 9/14/2017 N			MP16-3 1/18/2018 N			MP16-3 5/15/2018 N			MW-21D 12/13/2016 N			MW-21D 7/25/2017 N			MW-21D 9/14/2017 N			MW-21D 5/16/2018 N			
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	
Nickel	ug/L	100	NA			3.6	J	40	3.5	J	40	5.4	J	40	5.6	J	40	5.2	J	40	NA			14.6	J	40	151		40	
Potassium	ug/L	NS	NA			4640	J	5000	4590	J	5000	5140		5000	< 5000	U	5000	11100		5000	NA			10200		5000	9490		5000	
Selenium	ug/L	40	NA			< 35	U	35	< 35	U	35	< 35	U	35	< 35	U	35	< 35	U	35	NA			< 35	U	35	< 35	U	35	
Silver	ug/L	40	NA			< 10	U	10	< 10	U	10	0.34	J	10	< 10	U	10	< 10	U	10	NA			< 10	U	10	< 10	U	10	
Sodium	ug/L	50000	NA			108000		10000	106000		10000	119000		10000	103000		100000	1050000		100000	NA			1060000		100000	1050000		100000	
Thallium	ug/L	2	NA			< 25	U	25	< 25	U	25	< 25	U	25	< 25	U	25	< 25	U	25	NA			< 25	U	25	< 25	U	25	
Vanadium	ug/L	NS	NA			4.4	J	50	4.6	J	50	6.8	J	50	5	J	50	< 50	U	50	NA			< 50	U	50	< 50	U	50	
Zinc	ug/L	2000	NA			< 60	U	60	< 60	U	60	2.8	J	60	< 60	U	60	8.4	J	60	NA			142		60	18.9	J	60	
General Chemistry Parameters																														
Alkalinity, Bicarbonate as CaCO ₃	mg/L	NS	28.6		5	25.9		5	25.9		5	26.2		5	27.5		5	385		5	348		5	329		5	313		5	
Alkalinity, Carbonate as CaCO ₃	mg/L	NS	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	
Alkalinity, Hydroxide (OH)	mg/L	NS	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	NA			< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	
Alkalinity, Total	mg/L	NS	29.6	J	5	25.9		5	25.9		5	26.2		5	NA			385		5	348		5	329		5	313		5	
Carbon Dioxide	ug/L	NS	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	1900	J	5000	110000		5000	98000		5000	97000		5000	62000		5000	
Chloride	mg/L	250	717	J	30	459	J+	60	479	J+	60	641		30	NA			2550	J-	120	3290	J	120	4150	J+	240	1880		60	
Ferric Iron	mg/L	NS	0.26		0.1	0.43	J	0.1	0.2	J	0.1	< 0.1	UJ	0.1	1.5	J	0.1	12.5		0.1	3		0.1	8.8		0.1	10.2	J	0.1	
Ferrous Iron	mg/L	NS	< 0.1	UJ	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	0.079	J	0.1	< 0.1	UJ	0.1	9.2	J	1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	
Iron	ug/L	300	257		150	500	J	150	198	J	150	< 150	U	150	NA			21700		150	3020		150	8770		150	NA			
Nitrate as N	mg/L	10	NA			NA		NA				NA		NA				< 0.1	U	0.1	NA			NA			NA			
Nitrite as N	mg/L	1	NA			NA		NA				NA		NA				< 0.12	U	0.12	NA			NA			NA			
Nitrogen, Total Kjeldahl	mg/L	NS	NA			NA		NA				NA		NA				1.2		0.2	NA			NA			NA			
Sulfate	mg/L	250	350	J	150	262		60	262		30	277	J	150	249	J-	6	28.1	J-	0.6	381	J	30	163		6	505	J	60	
Sulfide	mg/L	NS	NA			NA		NA				NA		NA				< 1	U	1	NA			NA			NA			
Total Organic Carbon	mg/L	NS	1.3		1	1.1		1	1		1	1.4		1	1		1	7.8		1	8.3		1	7.7		1	6.2		1	

Table 4
Analytical Results
216 Paterson Plank Road Site
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Sample ID Sample Date N=Normal; FD=Field Duplicate		MW-21D 5/16/2018 FD			MW-21R 12/13/2016 N			MW-21R 7/25/2017 N			MW-21R 9/14/2017 N			MW-21R 1/18/2018 N			MW-21R 5/15/2018 N			MW-22D 12/13/2016 N			MW-22D 7/27/2017 N			MW-22D 9/14/2017 N			MW-22D 1/19/2018 N						
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL			
Volatile Organic Compounds																																			
1,1,1-Trichloroethane	ug/L	30	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,1,2,2-Tetrachloroethane	ug/L	1	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,1,2-Trichloroethane	ug/L	3	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,1-Dichloroethane	ug/L	50	12	J	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.43	J	0.5	0.46	J	0.5	0.37	J	0.5	0.55	0.5	0.46	J	0.5		
1,1-Dichloroethene	ug/L	1	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,2,3-Trichlorobenzene	ug/L	NS	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5	< 0.5	R	0.5			
1,2,4-Trichlorobenzene	ug/L	9	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,2-Dibromo-3-chloropropane	ug/L	0.02	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,2-Dibromoethane	ug/L	0.03	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,2-Dichlorobenzene	ug/L	600	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,2-Dichloroethane	ug/L	2	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,2-Dichloropropane	ug/L	1	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,3-Dichlorobenzene	ug/L	600	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
1,4-Dichlorobenzene	ug/L	75	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
2-Butanone	ug/L	300	< 5	R	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	R	5
2-Hexanone	ug/L	40	< 5	R	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	R	5
4-Methyl-2-pentanone	ug/L	NS	< 5	R	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	R	5
Acetone	ug/L	6000	< 5	R	5	< 5	U	5	< 8.9	U	8.9	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5.6	U	5.6	< 5	R	5
Benzene	ug/L	1	7.9	J	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
Bromochloromethane	ug/L	NS	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
Bromodichloromethane	ug/L	1	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5			
Bromoform	ug/L	4	< 0.5	R	0.5	< 0.5	U																												

Table 4
Analytical Results
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Sample ID Sample Date N=Normal; FD=Field Duplicate		MW-21D 5/16/2018 FD			MW-21R 12/13/2016 N			MW-21R 7/25/2017 N			MW-21R 9/14/2017 N			MW-21R 1/18/2018 N			MW-21R 5/15/2018 N			MW-22D 12/13/2016 N			MW-22D 7/27/2017 N			MW-22D 9/14/2017 N			MW-22D 1/19/2018 N			
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
Toluene	ug/L	600	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5
trans-1,2-Dichloroethene	ug/L	100	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5
trans-1,3-Dichloropropene	ug/L	1	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5
Trichloroethylene	ug/L	1	3.9	J	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5
Trichlorofluoromethane	ug/L	2000	< 0.5	R	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5
Vinyl Chloride	ug/L	1	1.5	J	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	U	0.5	< 0.5	R	0.5
Semivolatile Organic Compounds																																
1,4-Dioxane	ug/L	0.4	1700	J	160	< 2.1	U	2.1	0.59	J	2.1	0.91	J	2.3	1.1	J	2	2.2	0.2	740	70	630	55	670	44	660	64	670	80			
Total Metals																																
Aluminum	ug/L	200	< 200	U	200	< 200	U	200	291		200	NA		NA		820		200	< 200	U	200	< 200	U	200	NA			NA		< 200	U	200
Antimony	ug/L	6	< 60	UJ	60	< 60	U	60	< 60	U	60	NA		NA		< 60	UJ	60	< 60	U	60	< 60	U	60	NA		NA		< 60	UJ	60	
Arsenic	ug/L	3	5.5	J	10	< 10	U	10	< 10	U	10	NA		NA		< 10	U	10	5.1	J	10	< 10	U	10	NA		NA		2.1	J	10	
Barium	ug/L	6000	108	J	200	23.9	J	200	21	J	200	NA		NA		33.9	J	200	80.2	J	200	110	J	200	NA		NA		89.9	J	200	
Beryllium	ug/L	1	< 5	U	5	< 5	U	5	< 5	U	5	NA		NA		< 5	U	5	< 5	U	5	< 5	U	5	NA		NA		< 5	U	5	
Cadmium	ug/L	4	0.41	J	5	< 5	U	5	< 5	U	5	NA		NA		< 5	U	5	0.73	J	5	< 5	U	5	NA		NA		0.58	J	5	
Calcium	ug/L	NS	435000		10000	197000		5000	188000		5000	NA		NA		207000		5000	518000		10000	486000		10000	NA			NA		553000		20000
Chromium	ug/L	70	< 10	U	10	11		10	< 10	U	10	NA		NA		137		10	34.1		10	22.5		10	NA		NA		< 10	U	10	
Cobalt	ug/L	100	< 50	U	50	< 50	U	50	0.84	J	50	NA		NA		< 50	U	50	< 50	U	50	< 50	U	50	NA		NA		< 50	U	50	
Copper	ug/L	1300	13.4	J	25	< 25	U	25	10.4	J	25	NA		NA		21.9	J	25	3.8	J	25	22.1	J	25	NA		NA		7.8	J	25	
Hexavalent Chromium	ug/L	NS	NA			NA			< 10	U	10	< 10	U	10	< 10	U	10	NA		< 10	U	10	< 10	U	10	< 10	U	10	NA			
Iron	ug/L	300	9500		100	177		100	419		100	NA		NA		2040		100	1470		100	859		100	NA		NA		890		100	
Lead	ug/L	5	< 10	U	10	< 10	U	10	< 10	U	10	NA		NA		4.7	J	10	< 10	U	10	< 10	U	10	NA		NA		4.1	J	10	
Magnesium	ug/L	NS	140000		5000	19200		5000	18100		5000	NA		NA		21500		5000	109000		5000	90800		5000	NA		NA		101000		5000	
Manganese	ug/L	50	1540		15	352		15	565		15	NA		NA		461		15	740		15	718		15	NA		NA		1040		15	
Mercury	ug/L	2	< 0.2	UJ	0.2	< 0.2	U	0.2	< 0.2	U	0.2	NA		NA		< 0.2	UJ	0.2	< 0.2	U	0.2	< 0.2	U	0.2	NA		NA		< 0.2	UJ	0.2	
Nickel	ug/L	100	187	J	40	9.9	J	40	< 40	U	40	NA		NA		41.7		40	21.2	J	40	14.										

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Sample ID Sample Date N=Normal; FD=Field Duplicate		MW-21D 5/16/2018 FD			MW-21R 12/13/2016 N			MW-21R 7/25/2017 N			MW-21R 9/14/2017 N			MW-21R 1/18/2018 N			MW-21R 5/15/2018 N			MW-22D 12/13/2016 N			MW-22D 7/27/2017 N			MW-22D 9/14/2017 N			MW-22D 1/19/2018 N						
Parameter	Units	NJ GWQS ¹	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL						
Nickel	ug/L	100	148		40	4.1	J	40	NA			3.2	J	40	10.1	J	40	22.5	J	40	2.9	J	40	NA			< 40	U	40	< 40	U	40	2.2	J	40
Potassium	ug/L	NS	9370		5000	1710	J	5000	NA			1550	J	5000	1950	J	5000	< 5000	U	5000	12100		5000	NA			11400		5000	< 5000	U	5000	10800		5000
Selenium	ug/L	40	< 35	U	35	< 35	U	35	NA			< 35	U	35	< 35	U	35	< 35	U	35	NA			< 35	U	35	< 35	U	35	< 35	U	35			
Silver	ug/L	40	< 10	U	10	< 10	U	10	NA			< 10	U	10	0.72	J	10	0.72	J	10	< 10	U	10	NA			< 10	U	10	< 10	U	10	0.66	J	10
Sodium	ug/L	50000	1020000		100000	41900		5000	NA			41600		5000	52900		5000	49000		5000	585000		50000	NA			509000		40000	< 5000	U	5000	451000		50000
Thallium	ug/L	2	< 25	U	25	< 25	U	25	NA			< 25	U	25	< 25	U	25	< 25	U	25	< 25	U	25	NA			< 25	U	25	< 25	U	25	< 25	U	25
Vanadium	ug/L	NS	< 50	U	50	< 50	U	50	NA			4.1	J	50	2.2	J	50	2.5	J	50	< 50	U	50	NA			< 50	U	50	< 50	U	50	< 50	U	50
Zinc	ug/L	2000	16.8	J	60	3.1	J	60	NA			12.5	J	60	15.4	J	60	< 60	U	60	2.2	J	60	NA			< 60	U	60	< 60	U	60	2.4	J	60
General Chemistry Parameters																																			
Alkalinity, Bicarbonate as CaCO ₃	mg/L	NS	312		5	26.5		5	28.9		5	27.5		5	40.6		5	39.3		5	17.5		5	30.3		5	41.7		5	21.9		5	28.6		5
Alkalinity, Carbonate as CaCO ₃	mg/L	NS	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5			
Alkalinity, Hydroxide (OH)	mg/L	NS	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5	NA		< 5	U	5	< 5	U	5	< 5	U	5	< 5	U	5				
Alkalinity, Total	mg/L	NS	312		5	26.5		5	28.9	J	5	27.5		5	42.7		5	NA		17.5		5	30.3		5	41.7		5	21.9		5	28.6		5	
Carbon Dioxide	ug/L	NS	66000		5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	< 5000	U	5000	2200	J	5000
Chloride	mg/L	250	1910		60	189	J-	12	177	J	12	135	J+	12	195		8.4	NA		1740	J-	120	2300	J	120	1140	J+	120	2630		120	NA			
Ferric Iron	mg/L	NS	9.6	J	0.1	0.46		0.1	2		0.1	0.12		0.1	0.44	J	0.1	0.2	J	0.1	1.6		0.1	0.98		0.1	0.3		0.1	0.67	J	0.1	0.85	J	0.1
Ferrous Iron	mg/L	NS	0.21	J	0.1	0.3	J	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1	< 0.1	UJ	0.1									
Iron	ug/L	300	NA			763		150	1980		150	185		150	438		150	NA		1600		150	983		150	299		150	674		150	NA			
Nitrate as N	mg/L	10	NA			< 0.1	U	0.1	NA			NA		NA		NA		< 0.1	U	0.1	NA		NA		NA		NA		NA		NA		NA		NA
Nitrite as N	mg/L	1	NA			< 0.12	U	0.12	NA			NA		NA		NA		NA		< 0.12	U	0.12	NA		NA		NA		NA		NA		NA		NA
Nitrogen, Total Kjeldahl	mg/L	NS	NA			NA		NA			NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Sulfate	mg/L	250	383	J-	60	376	J-	60	367	J	60	242		60	448		42	327		30	209	J-	12	236		12	237		60	252	J	6	148	J-	60
Sulfide	mg/L	NS	NA			NA		NA			NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA		NA
Total Organic Carbon	mg/L	NS	6.3		1	1.2		1	1.2		1	< 1	U	1	1.4		1	< 1	U	1	2.2		1	2.3		1	2.2		1	2.4		1	2.3		1

Table 4
Analytical Results
216 Paterson Plank Road Site
Carlstadt, Bergen County, New Jersey

Notes:

1. NJ GWQS: Higher of the Practical Quantitation Limit and New Jersey Ground Water Quality Criterion (N.J.A.C. 7:9C) (January 2018), as well as Interim Groundwater Quality Criteria.
2. Detected results greater than the NJ GWQS are shown in **bold**.

Abbreviations:

NS = standard not available
NA = not analyzed
Qual = interpreted qualifier
RL = reporting limit
Units: ug/L = microgram per liter
mg/L = milligram per liter

Qualifiers:

J = estimated result
J+ = estimated result; biased high
J- = estimated result; biased low
R = rejected result
U = not detected above RL
UJ = not detected above RL; RL estimated

Table 5
Post Injection Field Readings
216 Paterson Plank NPL Site
Carlstadt, NJ

Well ID	Injection #1 6/27-29/2017	7/3/2017					7/5/2017					7/6/2017					7/7/2017				
		Time	Persulfate (g/L)	pH	Conductivity (mS/um)	Temp (°C)	Time	Persulfate (g/L)	pH	Conductivity (mS/um)	Temp (°C)	Time	Persulfate (g/L)	pH	Conductivity (mS/um)	Temp (°C)	Time	Persulfate (g/L)	pH	Conductivity (mS/um)	Temp (°C)
IP 16-2		1346	8.5	13	74.8	19.16	1039	7.5	13.27	88.41	17.69	-	20.5	12.87	47.04	17.78	1212	9	12.82	34.22	18.68
MP 16-1		1500	1.5	11.94	5.007	16	1032	2.5	11.52	5.3	15.63	-	0	11.45	6.19	15.85	1215	0	11.45	5.326	15.62
MP 16-2		1554	0	11.98	4.338	15.43	1230	0	11.5	4.429	15.64	920	0	11.35	4.294	15.6	1220	0	11.2	4.453	15.49
MP 16-3		1416	0	11.06	2.994	18.13	1049	1.5	10.08	2.951	16.8	-	0	9.6	2.871	16.49	1210	0	9.7	2.929	17.28
MW 22D		1512	0	8.71	6.04	15.28	1130	0	8.5	6.768	15.52	1030	0	8.65	6.656	15.5	1225	0	8.68	6.903	15.47
MW 21R		1433	0	8.32	1.125	15.67	1056	0	8.3	1.264	15.5	-	0	8.2	1.259	15.55	1207	0	7.89	1.284	16.31
MW 21D		1446	0	6.71	8.498	15.16	1115	0	6.02	9.55	15.19	-	0	6.53	9.5	15.19	1203	0	6.41	9.736	15.37
Entered by:	EDC 7/12/17 JAS 7/12/17 HAL 8/7/18					EDC 7/12/17 JAS 7/12/17 HAL 8/7/18					EDC 7/12/17 JAS 7/12/17 HAL 8/7/18					EDC 7/12/17 JAS 7/12/17 HAL 8/7/18					
Checked by:																					
Reviewed by:																					

Well ID	7/20/2017					7/25/2017					8/3/2017					8/8/2017					8/17/2017				
	Time	Persulfate (ppm) ¹	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)
IP 16-2	1211	28	13.69	93.75	16.17	1115	0	13.09	61.9	19.46	1440	>70	13.17	91.37	15.67	1048	>70	11.59	4.518	18.51	1225	>70	12.98	66.56	15.81
MP 16-1	1207	>70	11.23	4.372	15.22	1455	>70	10.45	6.94	20.21	1435	70	10.26	3.974	15.24	1045	21	8.57	1.35	19.03	1215	56	9.35	3.9	15.35
MP 16-2	1203	14	9.84	4.577	15.12	1450	5.6	9.58	4.64	20.75	1430	3.5	9.07	4.123	15.24	1040	21	8.58	0.239	17.78	1220	-	8.6	3.912	15.41
MP 16-3	1222	14	9.04	2.443	14.95	1110	0	7.92	3.58	17.76	1445	2.1	3.59	2.341	15.58	1051	14	8.7	2.358	17.77	1230	-	8.62	2.153	15.81
MW 22D	1156	0.7	8.21	6.215	15.5	1530	0	8.21	8.63	19.12	1425	0.7	7.96	6.147	15.62	1035	0	9.95	3.517	17.37	1210	-	8.49	5.222	15.38
MW 21R	1226	0.7	8.77	1.19	15.06	1715	0.7	8.46	1.38	20.93	1450	0.7	8.15	1.158	15.27	1055	0.7	8.37	1.213	16.89	1205	-	7.64	1.065	15.32
MW 21D	1152	0	6.25	8.601	16.3	1645	2.8	6.67	14.3	19.73	1455	0.7	6.9	8.51	15.59	1100	2.1	7.03	8.412	15.67	1200	-	6.47	7.673	15.74
Entered by:	MBS 9/25/17 JAS 9/25/17 HAL 8/7/18					MBS 9/25/17 JAS 9/25/17 HAL 8/7/18					MBS 9/25/17 JAS 9/25/17 HAL 8/7/18					MBS 9/25/17 JAS 8/17/17 HAL 8/7/18					MBS 9/25/17 JAS 8/17/17 HAL 8/7/18				
Checked by:																									
Reviewed by:																									

Well ID	8/23/2017					8/30/2017					9/7/2017					9/14/2017					9/22/2017				
	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)																				

Table 5
Post Injection Field Readings
216 Paterson Plank NPL Site
Carlstadt, NJ

Well ID	7/11/2017					11/7/2017					11/17/2017					Injection #2 12/4-7/2017					12/11/2017								
	Time	Persulfate (g/L)	pH	Conductivity (mS/um)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)														
IP 16-2	1054	0.1	13.11	91.79	16.7	1255	2.8	10.51	1.063	16.3	1141	5.6	9.21	0.422	16.63														
MP 16-1	1052	0	11.31	5.047	15.34	1305	5.6	8.62	4.252	15.92	1200	4.2	8.29	3.673	16.34														
MP 16-2	1054	0	11.02	4.337	15.33	1315	0.9	8.38	2.266	15.74	1218	2.8	8.41	1.707	16.1														
MP 16-3	1056	0	8.87	2.804	16.26	1245	0.5	7.61	2.519	16.18	1123	1.4	7.45	2.357	16.19														
MW 22D	1050	0	8.45	6.881	15.32	1215	0.2	9.18	4.133	15.57	1030	2.1	8.93	3.916	15.73														
MW 21R	1100	0	8.16	1.312	15.64	1235	0.7	7.69	1.314	16.15	1105	1.4	7.65	1.22	16.01														
MW 21D	1105	0	15	9.768	15.13	1225	0.5	8.32	9.339	13.49	1048	5.6	7.26	7.861	15.8														
Entered by:	EDC 7/12/17					MBS 11/9/17					MBS 11/20/17																		
Checked by:	JAS 7/12/17					JAS 11/28/17					JAS 11/28/17																		
Reviewed by:	HAL 8/7/18					HAL 8/7/18					HAL 8/7/18																		

Well ID	12/12/2017					12/13/2017					12/14/2017					12/15/2017					12/18/2017				
	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)
IP 16-2	1030	21	9.30	0.233	15.97	940	49	11.71	0.405	18.5	1625	>70	13.14	1.677	18.61	930	>70	13.30	2.226	18.65	1315	>70	12.25	5.402	17.12
MP 16-1	1020	5.6	7.69	0.44	16.08	930	14	8.46	0.443	18.17	1620	7	8.21	0.486	18.62	920	7	8.8	0.513	18.51	1305	5.6	8.23	0.605	17.47
MP 16-2	1010	2.8	7.08	0.192	15.11	920	2.1	8.51	0.187	17.7	1615	1.4	7.46	0.196	17.84	910	2.1	8.77	0.209	17.84	1255	2.1	8.72	0.293	17.34
MP 16-3	1040	35	7.53	2.231	15.94	950	70	9.52	1.819	17.91	1630	>70	9.6	1.828	18.3	940	70	9.07	1.858	18.5	1325	35	8.89	2.236	17.33
MW 22D	1000	0.7	8.56	3.709	14.72	910	0.7	8.5	2.974	17.39	1610	0.7	9.36	3.001	18.15	900	1.4	9.81	2.953	17.59	1245	0.7	10.33	3.573	16.01
MW 21R	1050	0.7	7.45	1.212	16.28	1000	2.8	8.84	1.016	17.7	1635	1.4	8.79	1.024	17.82	950	1.4	8.71	1.027	18.25	1335	1.4	8.11	1.119	17.95
MW 21D	1100	2.1	6.96	7.649	15.71	1010	1.4	7.63	6.387	17.86	1640	0.7	7.78	6.382	17.92	1000	1.4	7.75	6.378	17.93	1340	2.1	6.95	7.027	16.56
Entered by:	MBS 12/22/17					MBS 1/2/18					MBS 1/2/18					MBS 1/2/18					MBS 1/2/18				
Checked by:	MYS 12/29/17					JAS 7/19/18					HAL 8/7/18					JAS 7/19/18					JAS 7/19/18				
Reviewed by:	HAL 8/7/18					HAL 8/7/18					HAL 8/7/18					HAL 8/7/18					HAL 8/7/18				

Well ID	12/31/2017					Injection #3 1/10/2018					1/18/2018					1/25/2018					2/13/2018				
Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	Time	Persulfate (ppm)	pH	Conductivity (mS/cm)	Temp (°C)	

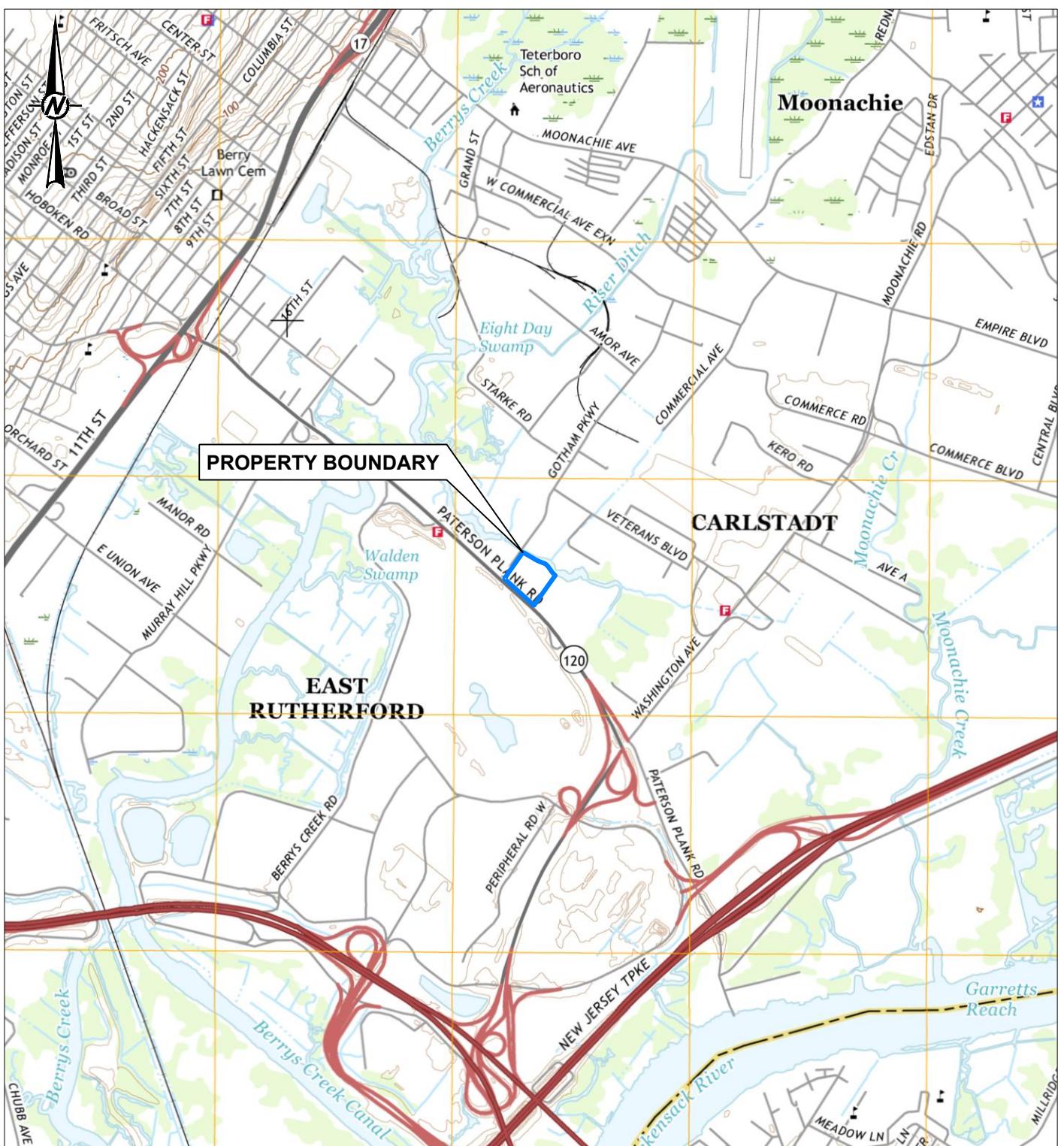
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Table 6
Injection Details
216 Paterson Plank NPL Site
Carlstadt, NJ

Injection 1										
Well ID	Date	Time	Rate (GPM)	Treatment Solution (cumulative gal)	Pressure @ Manifold (psi)	Pressure @ Well (psi)				
IP-16-2	6/27/2017	1445	3	-	-	12				
		1515	4.18	106	20	13				
		1550	5	310	20	13				
		1630	4.98	507	18	13				
		1700	-	611	-	-				
		1715	-	-	-	7				
IP-16-2	6/28/2017	1015	5.02	666	16	14				
		1100	4.87	894	16	13				
		1200	4.93	1131	17	14				
		1300	4.99	1455	20	14				
		1400	4.95	1763	20	15				
		1500	5.08	2034	21	15				
		1605	5.06	2237	20	15				
		1700	5.1	2642	20	14				
		1800	5.08	2950	20	15				
		1830	-	3054	-	-				
IP-16-2	6/29/2017	830	4.8	3223	20	14				
		930	4.96	3498	17	15				
		1040	5.06	3866	14	14				
		1120	-	4061	-	-				
		1155	flush ~ 100 gal H ₂ O							
Estimated Totals:	4,408 lbs sodium persulfate 1,100 gal sodium hydroxide solution 3,050 gal H ₂ O added and flushed									
Entered by:	EDC 7/12/17									
Checked by:	JAS 7/12/17									
Injection 2										
Well ID	Date	Time	Rate (GPM)	Treatment Solution (cumulative gal)	Pressure @ Manifold (psi)	Pressure @ Well (psi)				
IP-16-2	12/4/2017	14:15	4.4	-	-	-				
		14:30	4.61	75	15	5				
		15:00	4.96	237	15	5				
		15:17	-	279	-	-				
IP-16-2	12/5/2017	9:20	4.93	327	17	5				
		9:45	4.64	400	16	-				
		10:05	4.91	489	17	-				
		10:33	4.92	642	17	-				
		11:12	5.02	839	17	-				
		12:00	4.98	1087	17	-				
		12:34	5.16	1249	17	-				
		13:00	5.01	1374	17	-				
		13:37	4.98	1570	17	-				
		14:10	5.05	1723	17	-				
		14:50	4.98	1947	17	-				
		15:25	4.97	2120	17	-				
		15:50	5.13	2235	17	-				
		16:16	-	2366	17	-				

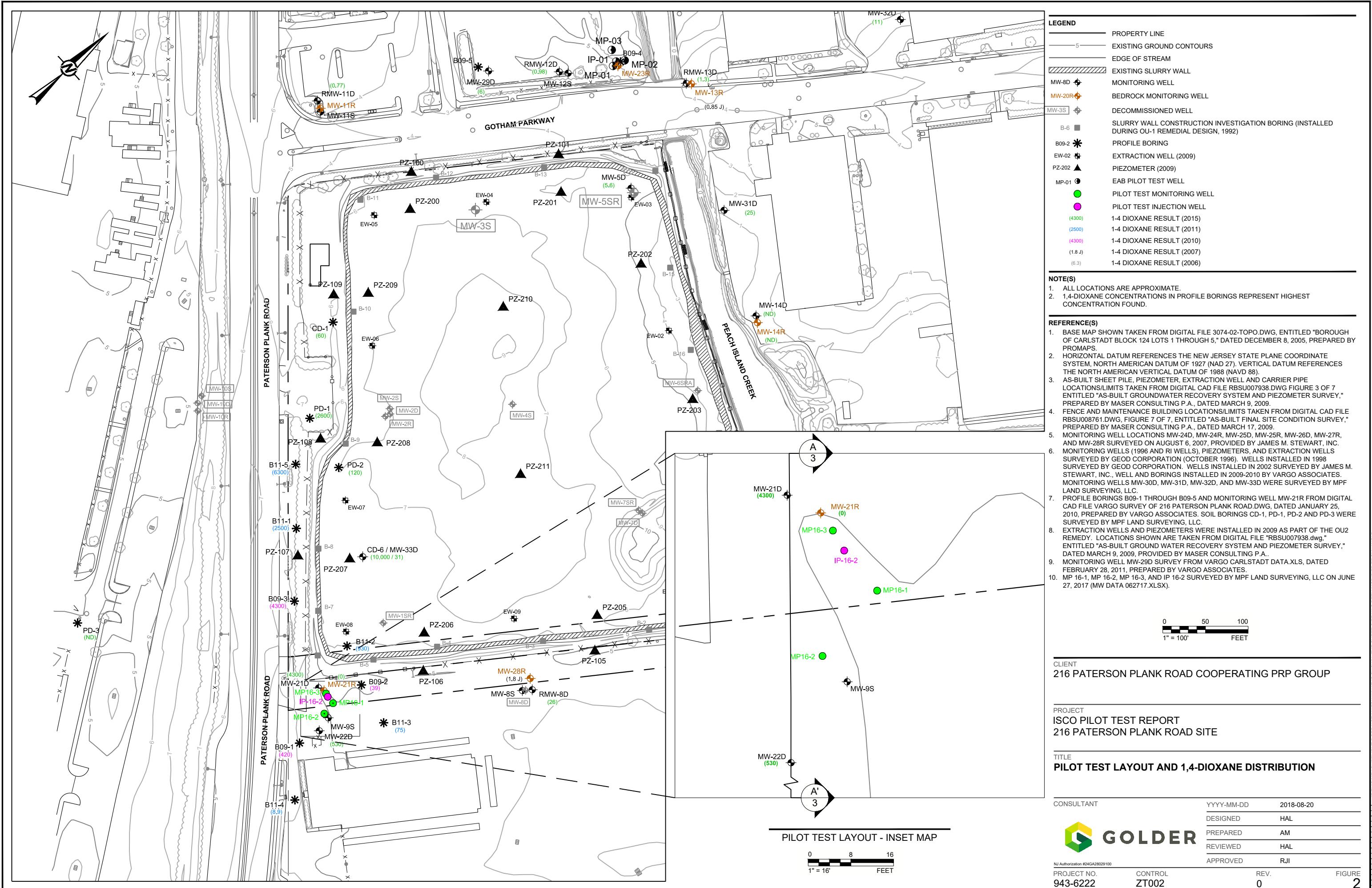
Table 6
Injection Details
216 Paterson Plank NPL Site
Carlstadt, NJ

Well ID	Date	Time	Rate (GPM)	Treatment Solution (cumulative gal)	Pressure @ Manifold (psi)	Pressure @ Well (psi)			
IP-16-2	12/6/2017	8:05	5	-	-	-			
		8:55	5.05	2648	15	-			
		9:40	5.02	2875	15	-			
		10:45	5.15	3200	17	-			
		11:35	5.1	3449	19	-			
		12:55	5	3852	19	-			
		13:55	-	4173	-	-			
		14:40	7.6	4466	22	-			
		15:20	7.92	4775	22	-			
		16:05	8.32	5081	21	-			
		16:38	9.59	5288	21	-			
IP-16-2	12/7/2017	8:45	7.4	5427	-	-			
		9:30	7.56	5643	-	-			
		9:45	8	-	-	7			
		9:46	10	-	-	8			
		9:47	12	-	-	9			
		10:33	-	6202	-	-			
		11:10	-	6518	-	-			
		11:15	8.2	6550	-	-			
		12:45	7.83	7240	-	-			
		15:10		flush ~ 100 gal H ₂ O					
Estimated Totals:	8,265 lbs sodium persulfate 1,800 gal sodium hydroxide solution 5,500 gal H ₂ O added and flushed								
Entered by:	JIH 1/2/18								
Checked by:	MBS 1/2/18								
Injection 3 (NaOH only)									
0 lbs sodium Persulfate				1,500 gal sodium hydroxide	100 gallons H ₂ O				
Well ID	Date	Time	Rate (GPM)	NaOH Solution (cumulative gal)	Pressure @ Manifold (psi)	Pressure @ Well (psi)			
Well ID	Date	Time	Rate (GPM)	Total Volume (gal)	Pressure @ Manifold (ps)	Pressure @ Well (psi)			
MP-16-2	1/10/2018	13:55	7.99	347	39	17			
		14:00	6.35	533	36	-			
		15:20	7.13	933	-	-			
		16:00	8.93	1289	-	-			
		16:25	9.01	1504	-	-			
				flush ~ 100 gal H ₂ O					
Estimated Totals:	0 lbs sodium persulfate 1,500 gal sodium hydroxide solution 100 gal H ₂ O flushed								
Entered by:	VRR 2/7/2018								
Checked by:	JRG 7/18/18								
Reviewed by:	HAL								



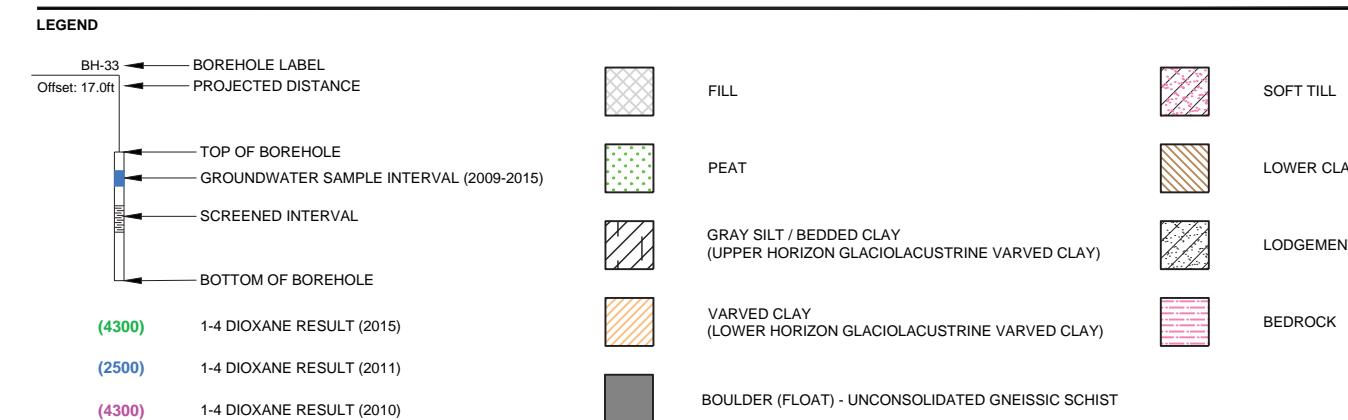
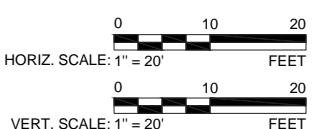
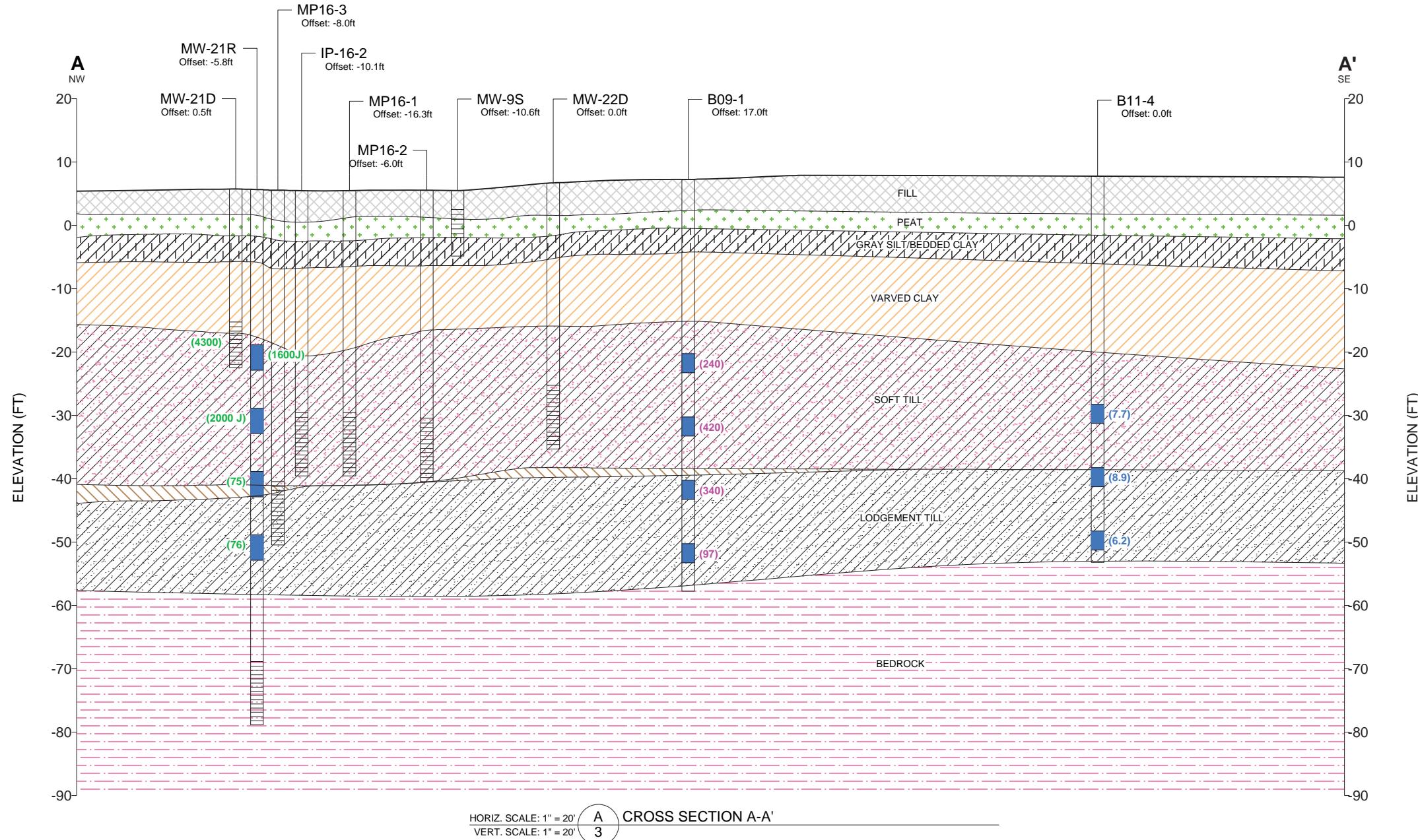
PROJECT NO.	CONTROL	REV.	FIGURE
943-6222	ZT001	0	1

1 in IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A



NOTE(S)

1. LOWER CLAY WAS OBSERVED IN CONTINUOUS CORES COLLECTED IN 2009-2010; SPLIT SPOONS WERE TAKEN ON APPROXIMATELY 5 FOOT INTERVALS IN BORINGS COLLECTED IN 2011.
2. 1,4-DIOXANE CONCENTRATIONS IN $\mu\text{g/L}$.



CLIENT
216 PATERSON PLANK ROAD COOPERATING PRP GROUP

PROJECT
ISCO PILOT TEST REPORT
216 PATERSON PLANK ROAD SITE

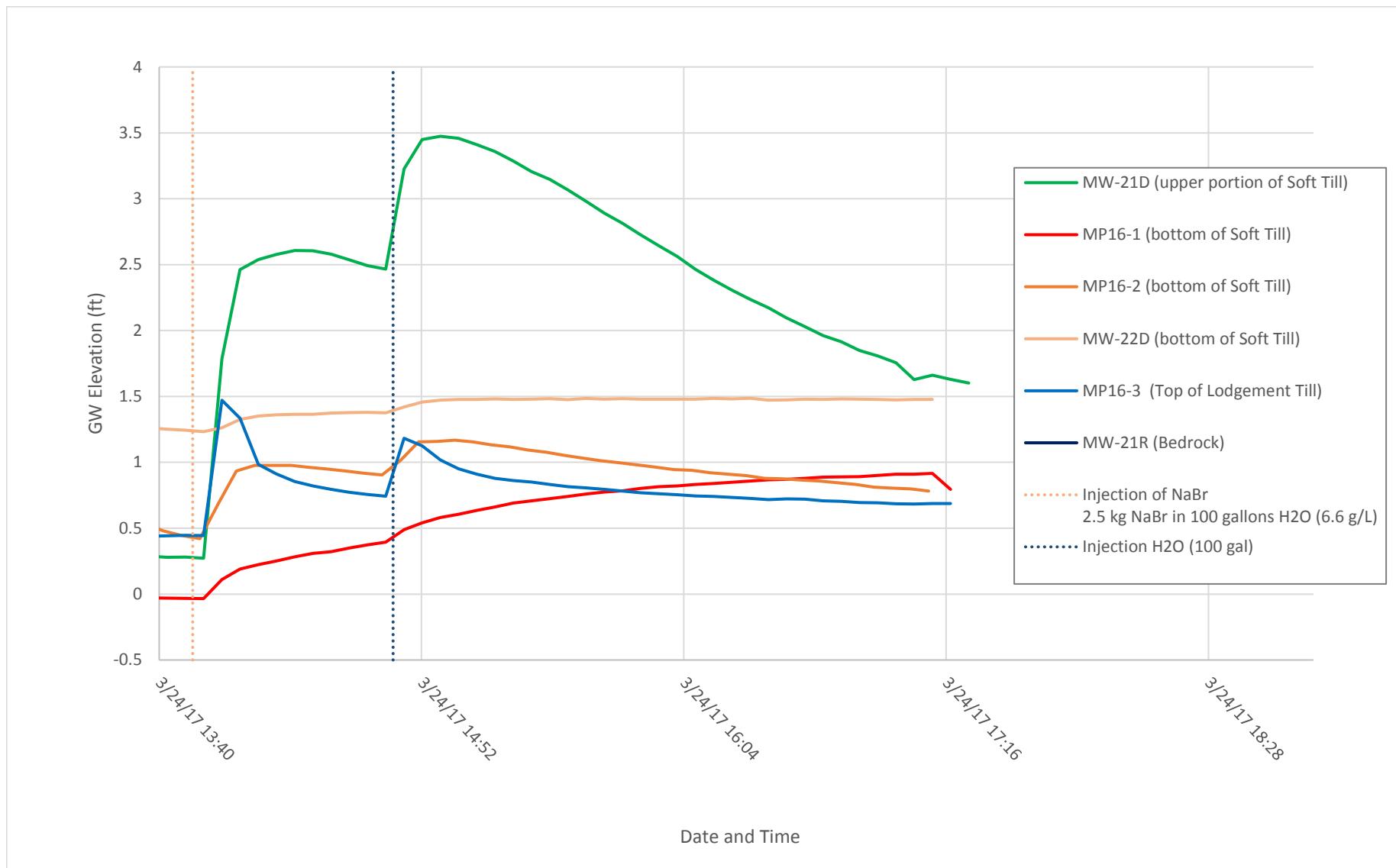
TITLE
GEOLOGIC CROSS SECTION A-A'

CONSULTANT YYYY-MM-DD 2018-08-20
DESIGNED HAL
PREPARED GLS
REVIEWED HAL
APPROVED RJI

GOLDER
NJ Authorization #24GA28029100

PROJECT NO. 943-6222 **CONTROL** ZT003 **REV.** 0 **FIGURE** 3

Figure 4
Water Level Response to Injection
216 Paterson Plank Road Site
Carlstadt, New Jersey

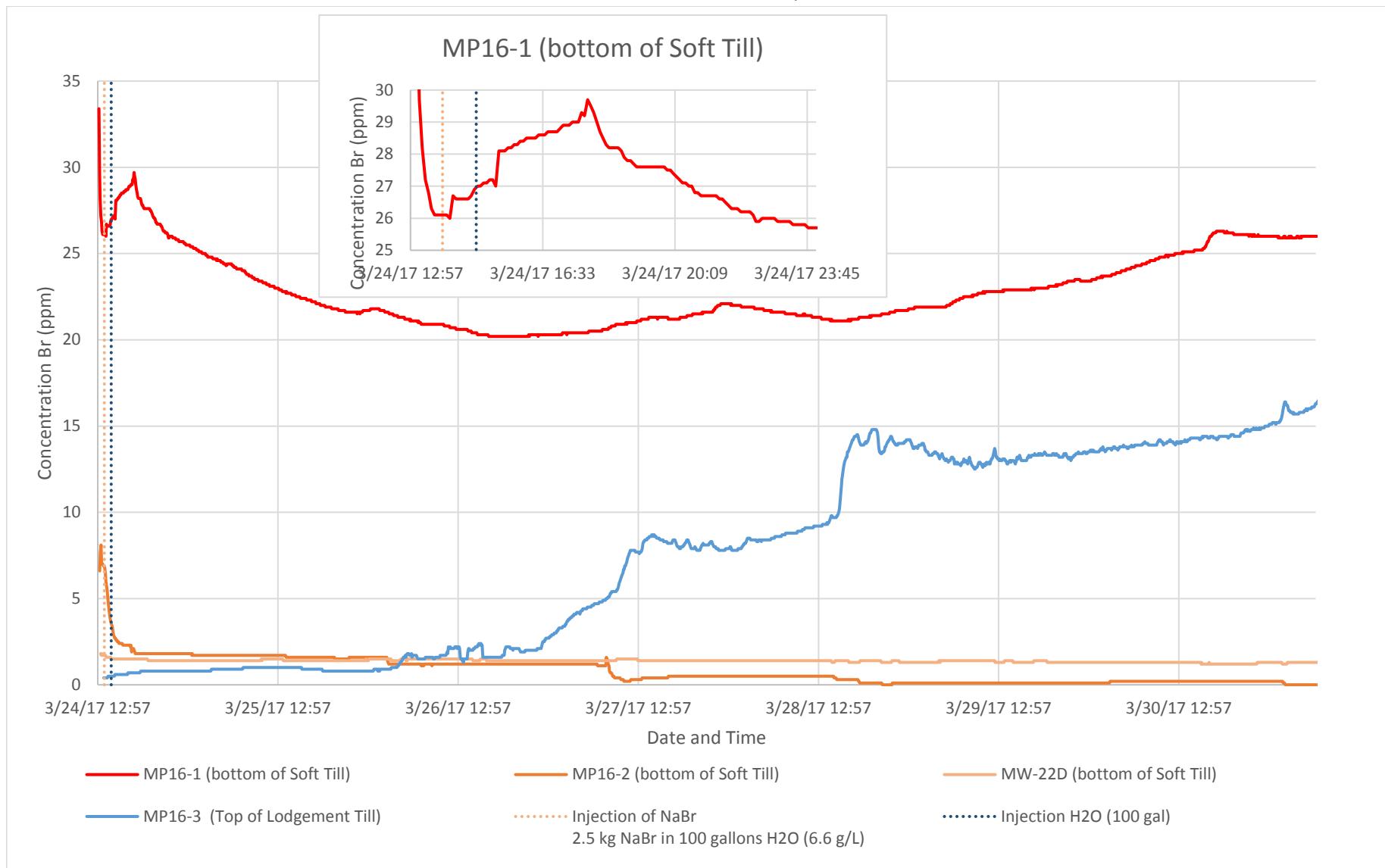


Made by: SS 4/13/17

Checked by: HAL 4/13/17

Reviewed by: HAL

Figure 5
Bromide Concentration Response to Injection
 216 Paterson Plank Road Site
 Carlstadt, New Jersey



Made by: SS 4/13/17
 Checked by: HAL 4/13/17
 Reviewed by: HAL

Figure 6
 1,4-Dioxane Concentration Trends
 216 Paterson Plank Road Site
 Carlstadt, New Jersey

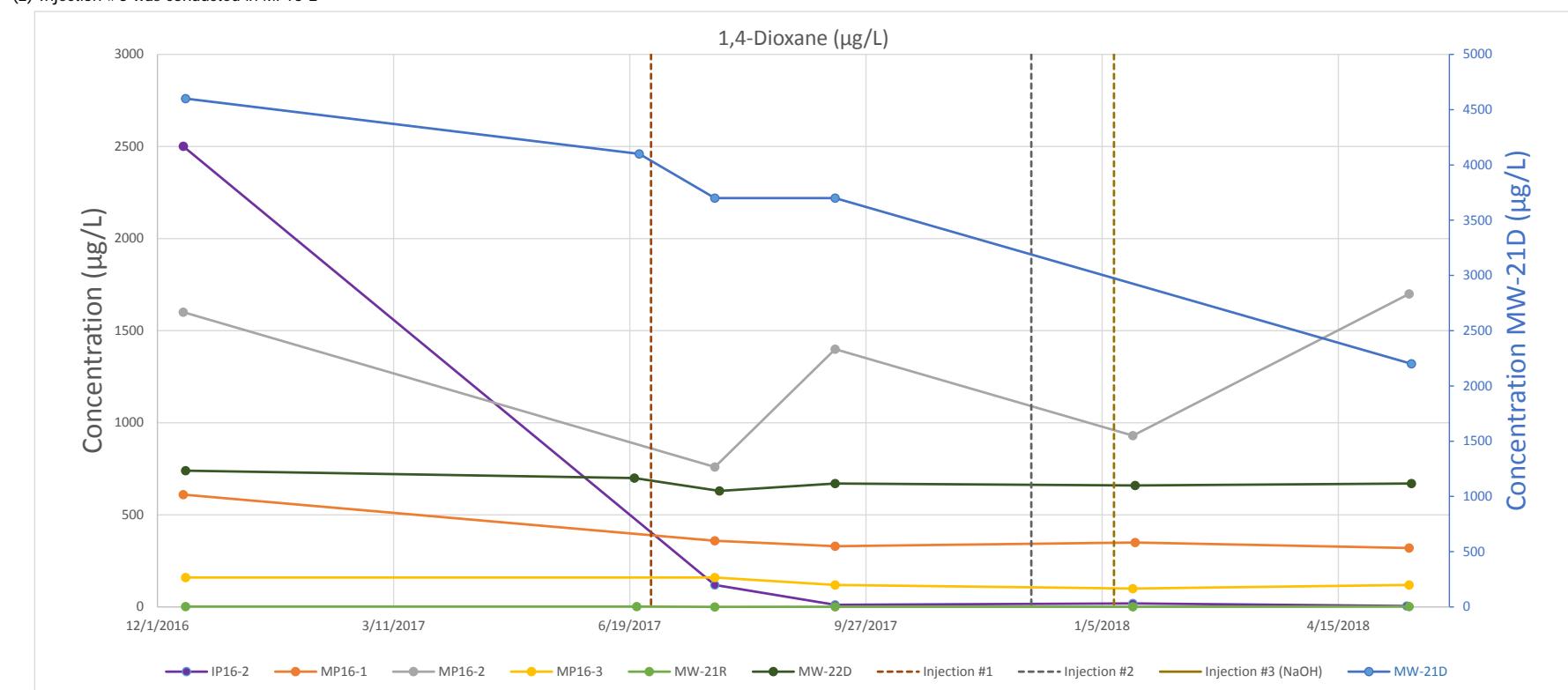
Plan view Distance. (ft)	Lithology	Well ID	Screen (ft bgs)	1,4-Dioxane Concentrations ($\mu\text{g}/\text{L}$)								Maximum % reduction
				12/12/2016	June 27-29 2017	7/25/2017	9/14/2017	December 4-7, 2017	January 2018	1/18/2018	5/15/2018	
0	bottom of soft till	IP16-2	35-45	2500	Injection #1	120	12	Injection #2	Injection #3 (NaOH only) ²	19	5.3	99.8% May-18
9.7	bottom of soft till	MP16-1	35-45	610		360	330			350	320	47.5% May-18
20.2	bottom of soft till	MP16-2	36-46	1600		760	1400			930	1700	52.5% Jul-17
4.3	Top of lodgement till	MP16-3	46-56	160 J-		160	120 J			100	120	37.5% Jan-18
14.9	upper soft till	MW-21D	21-28.2	4600		3700	3700			(1)	2200	52.2% May-18
8.3	bedrock	MW-21R	74.5-84.5	ND		0.59 J	0.91 J			1.1	2.2	No Response
41	bottom of soft till	MW-22D	32-42	740		630	670			660	670	14.9% Jul-17

Bold indicates the minimum 1,4-dioxane measured

Notes:

(1) MW-21D was inaccessible beneath a snowpile in January 2018

(2) Injection #3 was conducted in MP16-2



APPENDIX A

**Well Information (Well Logs, Form
As, Form Bs)**

RECORD OF BOREHOLE IP16-2

SHEET 1 of 2

PROJECT: Carlstadt OU-3
PROJECT NUMBER: 943-6222.14
DRILLED DEPTH: 46.0 ft
AZIMUTH: N/A
LOCATION: Carlstadt, NJ

DRILL METHOD: HSA/Rotosonic
DRILL RIG: CME-75/Fraste ML SRS
DATE STARTED: 10/28/16
DATE COMPLETED: 11/1/16
WEATHER: Sunny

DATUM: NJ State Plane NAD 1983
COORDS: N: 724,822.8 E: 610,888.8
GS ELEVATION: 5.5 ft
TOC ELEVATION: 5.0 ft
TEMPERATURE: 50s

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N	REC / ATT		
0	0											
5	-5	0.0 - 0.7 ASPHALT, black		4.8 0.7								
5	0	0.7 - 5.0 FILL, (GP), SAND and GRAVEL, with concrete and cobbles; gray, dry, compact to dense (Soft Dig cuttings).	GP	0.5 5.0 -1.5	0.0 NA NA	1	2 IN SS	5 - 5 - 5 - 9	10 0.7 2.0			Flushmount Protective Vault
5	5	5.0 - 7.0 FILL, (GP), GRAVEL and COBBLES; gray, wet, compact.	GP	7.0 -2.8	1.9 3.7	2	2 IN SS	18 - 2 - 1 - 1	3 1.3 2.0			
5	10	7.0 - 8.3 (PT), SILTY PEAT, with plant fibers; brown, odor, cohesive, moist, soft.	PT	8.3 -3.5	17.1							
5	10	8.3 - 9.0 (CL), CLAY, with plant fibers; brown, cohesive, moist, soft.	CL	9.0 -5.5	0.0 0.0	3	2 IN SS	4 - 4 - 6 - 6	10 1.1 2.0			
5	15	9.0 - 11.0 (ML), SILT, some peat, some clay; orange gray, slightly cohesive, moist, stiff.	ML	11.0 -6.4	0.0 0.0	4	2 IN SS	3 - 3 - 4 - 4	7 1.4 2.0			
5	20	11.0 - 11.9 (ML), CLAYEY SILT; orange gray, cohesive, moist to wet, firm.	MH	11.9 -7.5	0.0 NA							
5	25	11.9 - 13.0 (CL), CLAY, some silt; orange gray, cohesive, moist, firm.	CL	13.0 -9.5		5	2 IN SS	N/A		0.0 2.0		
5	30	13.0 - 15.0 No Recovery in spoon, clay observed on outside of spoon.		15.0 -11.5		6	2 IN SS	N/A		0.0 2.0		
5	35	15.0 - 17.0 No Recovery in spoon, clay observed on outside of auger flights.		17.0 -13.5	0.0 0.0	1	ROTO SONIC	N/A		2.0 2.0		
5	40	17.0 - 19.0 (CL), SILTY CLAY; gray brown, cohesive, wet, soft.	CL	19.0 -18.5		2	ROTO SONIC	N/A		0.0 5.0		
5	45	19.0 - 24.0 No Recovery										
5	50	24.0 - 25.0 (CL), SILTY CLAY; gray brown, wet, soft.	CL	24.0 -19.5	0.0 0.0	3	ROTO SONIC	N/A		0.6 5.0		
5	55	25.0 - 29.0 No Recovery		25.0 -23.5		4	ROTO SONIC	N/A		1.4 5.0		
5	60	29.0 - 29.8 (CH), CLAY with plant fibers and organic materials; brown, cohesive, wet,	CH	29.0 -24.3	0.0							
5	65	Log continued on next page										

RECORD OF BOREHOLE IP16-2

SHEET 2 of 2

PROJECT: Carlstadt OU-3
PROJECT NUMBER: 943-6222.14
DRILLED DEPTH: 46.0 ft
AZIMUTH: N/A
LOCATION: Carlstadt, NJ

DRILL METHOD: HSA/Rotosonic
DRILL RIG: CME-75/Fraske ML SRS
DATE STARTED: 10/28/16
DATE COMPLETED: 11/1/16
WEATHER: Sunny

DATUM: NJ State Plane NAD 1983
COORDS: N: 724,822.8 E: 610,888.8
GS ELEVATION: 5.5 ft
TOC ELEVATION: 5.0 ft
TEMPERATURE: 50s

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N	REC / ATT		
30												
-25	soft. 29.8 - 34.0 (SM) SILTY SAND with GRAVEL, fine to coarse subrounded; red brown, slightly cohesive, wet, loose. <i>(Continued)</i>	SM		29.8	0.0	NA						
		SM		-28.5		NA						
35	34.0 - 39.0 (ML), SANDY SILT with GRAVEL and COBBLES, fine to coarse, subrounded, some clay; red brown, wet, compact.	ML		34.0	0.0	0.0						
-30						0.0						
						5	ROTO SONIC	N/A				
40	39.0 - 39.9 (SP), SAND, fine to medium, with rounded cobbles; red brown, wet, compact. 39.9 - 44.0 (SM), SILTY SAND, with GRAVEL and COBBLES, fine to coarse, subrounded; red brown, wet, compact.	SP		39.0 -34.4 39.9	0.0	0.0						
-35		SM		-33.5	0.0	0.0						
						6	ROTO SONIC	N/A				
45	44.0 - 46.0 (CL), SILTY CLAY with GRAVEL, fine to coarse, subangular to subrounded, trace sand, siltstone fragments; red brown, moist, hard.	CL		44.0 -40.5	0.0	7	ROTO SONIC	N/A				
-40	Boring completed at 46.0 ft				0.0							
50												
55												
60												

RECORD OF BOREHOLE MP16-1

SHEET 1 of 2

PROJECT: Carlstadt OU-3
PROJECT NUMBER: 943-6222.14
DRILLED DEPTH: 46.0 ft
AZIMUTH: N/A
LOCATION: Carlstadt, NJ

DRILL METHOD: HSA/Rotosonic
DRILL RIG: CME-75/Fraste ML SRS
DATE STARTED: 10/28/16
DATE COMPLETED: 11/2/16
WEATHER: Overcast/Sunny

DATUM: NJ State Plane NAD 1983
COORDS: N: 724,822.3 E: 610,898.5
GS ELEVATION: 5.5 ft
TOC ELEVATION: 5.1 ft
TEMPERATURE: 50s

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N		
0	0.0 - 0.7 ASPHALT, black.			4.8 0.7							
5	0.7 - 5.0 FILL, (GP), SAND and GRAVEL, with concrete and cobbles; gray, dry, compact to dense (Soft Dig cuttings).	GP		0.5							
10	5.0 - 5.4 FILL, (SP), SAND, fine; red brown, dry, loose.	SP		0.1 5.4							
15	5.4 - 7.0 (PT), SILTY PEAT, with plant fibers; brown, cohesive, moist, firm.	PT		-1.5							
20	7.0 - 7.9 (PT), SILTY PEAT, with plant fibers, brown, cohesive, moist, firm.	PT		7.0 -2.4							
25	7.9 - 8.3 (CL), CLAY, some silt; brown, cohesive, moist, soft.	CL		8.3 -2.8 -3.5							
30	8.3 - 9.0 (MH), CLAYEY SILT, gray, cohesive, moist, soft.	MH		9.0 -5.5							
35	9.0 - 11.0 (ML), SILT, some clay; orange gray, cohesive, moist, firm.	ML		NA 11.0 -6.5							
40	11.0 - 12.0 (ML), SILT, some clay; gray, cohesive, moist, stiff.	ML		12.0 -7.5							
45	12.0 - 13.0 (ML), SILT; orange tan, cohesive, moist, stiff.	CL		13.0 -9.5							
50	13.0 - 15.0 (CL), CLAY, mottled, very thinly bedded; orange brown, cohesive, moist, stiff.	CL		15.0 -9.0 -13.5							
55	15.0 - 19.0 (CL), SILTY CLAY, trace sand and gravel; gray brown, cohesive, wet, stiff.	CL		19.0 0.0 0.0 NA							
60	19.0 - 24.0 (CL), SILTY CLAY, trace sand; gray brown, cohesive, wet, firm.	CL		24.0 0.0 0.0 NA							
65	24.0 - 29.0 (CL), SILTY CLAY; gray brown, cohesive, wet, stiff.	CL		-18.5 29.0							
70	29.0 - 34.0 (CL), SILTY CLAY, some fine sand and gravel; brown, cohesive, wet, stiff.	CL		-23.5							
75	Log continued on next page										

AA BOREHOLE RECORD 943-6222 PDI BORING LOGS.GPJ GOLDER NJ-PA 05-24-06.GDT 8/17/18

LOG SCALE: 1 in = 4 ft

DRILLING COMPANY: Summit Drilling

DRILLER: J.Langford/B.Shinn

GA INSPECTOR: JWJ

CHECKED BY: RCL

DATE: 8/7/18



RECORD OF BOREHOLE MP16-1

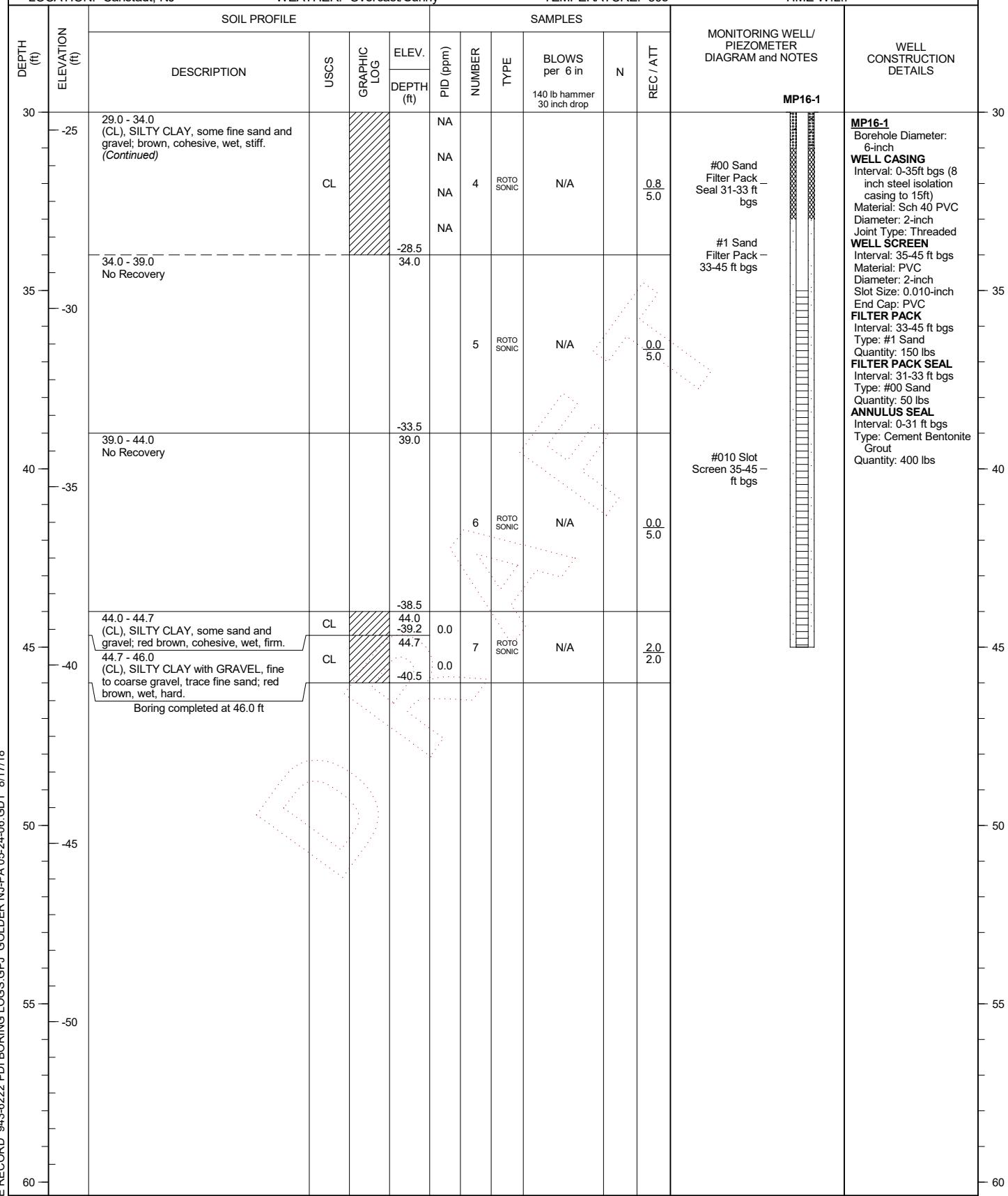
SHEET 2 of 2

PROJECT: Carlstadt OU-3
PROJECT NUMBER: 943-6222.14
DRILLED DEPTH: 46.0 ft
AZIMUTH: N/A
LOCATION: Carlstadt, NJ

DRILL METHOD: HSA/Rotosonic
DRILL RIG: CME-75/Fraser ML SRS
DATE STARTED: 10/28/16
DATE COMPLETED: 11/2/16
WEATHER: Overcast/Sunny

DATUM: NJ State Plane NAD 1983
COORDS: N: 724,822.3 E: 610,898.5
GS ELEVATION: 5.5 ft
TOC ELEVATION: 5.1 ft
TEMPERATURE: 50s

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:



RECORD OF BOREHOLE MP16-2

SHEET 1 of 2

PROJECT: Carlstadt OU-3
PROJECT NUMBER: 943-6222.14
DRILLED DEPTH: 46.0 ft
AZIMUTH: N/A
LOCATION: Carlstadt, NJ

DRILL METHOD: HSA/Rotosonic
DRILL RIG: CME-75/Fraske ML SRS
DATE STARTED: 10/28/16
DATE COMPLETED: 11/3/16
WEATHER: Sunny

DATUM: NJ State Plane NAD 1983
COORDS: N: 724,806.5 E: 610,900.7
GS ELEVATION: 5.6 ft
TOC ELEVATION: 5.1 ft
TEMPERATURE: 50s

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES						MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N	REC / ATT			
0	0												
5	5	0.0 - 0.7 ASPHALT, black.		4.9 0.7									
5	0	0.7 - 5.0 FILL, (GP), SAND and GRAVEL, fine to coarse sand and fine gravel, some silt; brown, moist to wet, compact (Soft Dig Cuttings).	GP	5.0 0.6		NM							
10	5	5.0 - 7.0 (PT), SILTY PEAT, with plant fibers; brown, cohesive, moist, very soft.	PT	5.0 -1.4	6.3 13.2 21.1 0.0	1	2 IN SS	1 - 1 - 1 - 1	2	1.8 2.0			
10	0	7.0 - 7.8 (PT), PEAT, some clay, with plant fibers; brown, moist, soft.	PT	7.0 -2.2	0.0								
10	-5	7.8 - 9.0 (CL), CLAY; brown, cohesive, moist, soft.	CL	7.8 -3.4	0.0 0.0	2	2 IN SS	WH - 1 - 1 - 1	1	1.1 2.0			
10	-10	9.0 - 11.0 (ML), SILT, trace clay; orange gray, cohesive, moist, soft to firm.	ML	9.0 -5.4	0.0 NA	3	2 IN SS	2 - 2 - 2 - 2	4	1.3 2.0			
15	-5	11.0 - 12.2 (ML), SILT; gray, cohesive, moist, stiff.	ML	11.0 -6.6	0.0 0.0								
15	-10	12.2 - 13.0 (CL), CLAY, some silt; nodules, slightly bedded, orange to brown, cohesive, moist, stiff.	CL	12.2 -7.4 13.0	0.0 0.0 0.0	4	2 IN SS	6 - 6 - 12 - 15	18	2.0 2.0			
15	-15	13.0 - 15.0 (CL), CLAY, bedded; orange brown, cohesive, moist, stiff.	CL	13.0 -9.4	0.0 0.0	5	2 IN SS	2 - 4 - 5 - 7	9	1.8 2.0			
20	-10	15.0 - 19.0 No Recovery		15.0 -13.4		1	ROTO SONIC	N/A		0.0 4.0			
20	-20	19.0 - 24.0 (CL), SILTY CLAY; gray brown, cohesive, wet, firm.	CL	19.0 -18.4	0.0 0.0 0.0 0.0	2	ROTO SONIC	N/A		3.4 5.0			
25	-20	24.0 - 24.5 (CL), SILTY CLAY, some gravel; gray brown, cohesive, wet, firm.	CL	24.5 -18.9	0.0	NA							
25	-30	24.5 - 29.0 No Recovery				NA				0.5 5.0			
30	-30	29.0 - 30.3 (CL), SILTY CLAY; gray brown, cohesive, wet, soft.	CL	29.0 -23.4		3	ROTO SONIC	N/A		3.3 5.0			

Log continued on next page

RECORD OF BOREHOLE MP16-2

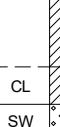
SHEET 2 of 2

PROJECT: Carlstadt OU-3
 PROJECT NUMBER: 943-6222.14
 DRILLED DEPTH: 46.0 ft
 AZIMUTH: N/A
 LOCATION: Carlstadt, NJ

DRILL METHOD: HSA/Rotosonic
 DRILL RIG: CME-75/Frasse ML SRS
 DATE STARTED: 10/28/16
 DATE COMPLETED: 11/3/16
 WEATHER: Sunny

DATUM: NJ State Plane NAD 1983
 COORDS: N: 724,806.5 E: 610,900.7
 GS ELEVATION: 5.6 ft
 TOC ELEVATION: 5.1 ft
 TEMPERATURE: 50s

INCLINATION: -90
 DEPTH W.L.:
 ELEVATION W.L.:
 DATE W.L.:
 TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N	REC / ATT			
30													
-25	30.3 - 34.0 (MH), CLAYEY SILT, some sand and gravel, cobbles and siltstone fragments; red brown, slightly cohesive, wet, stiff.	MH		-24.7 30.3	0.0	0.0	ROTO SONIC	N/A		3.3 5.0	#00 Sand Filter Pack – Seal 32-34 ft bgs	MP16-2 Borehole Diameter: 6-inch WELL CASING Interval: 0-36ft bgs (8 inch steel isolation casing 16ft) Material: Sch 40 PVC Diameter: 2-inch Joint Type: Threaded WELL SCREEN Interval: 36-46 ft bgs Material: PVC Diameter: 2-inch Slot Size: 0.010-inch End Cap: PVC FILTER PACK Interval: 34-46 ft bgs Type: #1 SAND Quantity: 150 lbs FILTER PACK SEAL Interval: 32-34 ft bgs Type: #00 Sand Quantity: 50 lbs ANNULUS SEAL Interval: 0-32 ft bgs Type: Cement Bentonite Grout Quantity: 400 lbs	
35	34.0 - 39.0 (MH), CLAYEY SILT, some sand and gravel; red brown, cohesive, wet, stiff.	MH		-28.4 34.0	0.0	0.0	ROTO SONIC	N/A		2.7 5.0	#1 Sand Filter Pack – 34-46 ft bgs		
-30		MH				NA							
40	39.0 - 39.5 (SP), GRAVELLY SAND, fine to medium, some clay; red brown, wet, loose. 39.5 - 44.0 (CL), SILTY CLAY, some sand and gravel; red brown, cohesive, wet, stiff.	MH		-33.4 39.5	0.0	0.0	ROTO SONIC	N/A		2.1 5.0	#010 Slot Screen 36-46 – ft bgs		
-35	39.5 - 44.0 (CL), SILTY CLAY, some sand and gravel; red brown, cohesive, wet, stiff.	CL		-33.9 39.5	0.0	0.0	ROTO SONIC	N/A					
45	44.0 - 44.7 (CL) SILTY CLAY; red brown, cohesive, moist, stiff. 44.7 - 45.4 (SW), GRAVELLY SAND, fine to coarse; red brown, wet, loose.	CL		-38.4 44.0 -39.1 44.7 -39.8 45.4 -40.4	0.0	0.0	ROTO SONIC	N/A		2.0 2.0			
-40	45.4 - 46.0 (CL) SILTY CLAY, some fine to coarse gravel and sand, siltstone fragments; red brown, cohesive, wet, hard.	CL											
	Boring completed at 46.0 ft												
50													
55													
60													

LOG SCALE: 1 in = 4 ft

DRILLING COMPANY: Summit Drilling
 DRILLER: J.Langford/B.Shinn

GA INSPECTOR: JWJ

CHECKED BY: RCL

DATE: 8/7/18



RECORD OF BOREHOLE MP16-3

SHEET 1 of 2

PROJECT: Carlstadt OU-3
PROJECT NUMBER: 943-6222.14
DRILLED DEPTH: 56.0 ft
AZIMUTH: N/A
LOCATION: Carlstadt, NJ

DRILL METHOD: HSA/Rotosonic
DRILL RIG: CME-75/Fraste ML SRS
DATE STARTED: 10/27/16
DATE COMPLETED: 10/31/16
WEATHER: Overcast/Sunny

DATUM: NJ State Plane NAD 1983
COORDS: N: 724,823.7 E: 610,884.6
GS ELEVATION: 5.6 ft
TOC ELEVATION: 5.1 ft
TEMPERATURE: 50s

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	PID (ppm)	NUMBER	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N		
0	0			4.9							
5	-5	0.0 - 0.7 ASPHALT, black		0.7							
5	0	0.7 - 5.0 FILL, (GP) SAND and GRAVEL, fine to coarse, with concrete and cobbles; gray, moist to wet, compact to dense (Soft dig Cuttings).	GP	0.6		NM					
5	5	5.0 - 7.0 FILL, (GP) SANDY GRAVEL, with cobbles; brown to gray, moist, compact.	GP	5.0		NM	1	2 IN SS	2 - 2 - 3 - 2	5 0.7 2.0	
5	10	7.0 - 9.0 (PT) SILTY PEAT, some clay; brown, cohesive, moist, soft.	PT	-1.4		NM	2	2 IN SS	1 - 1 - 1 - 1	2 1.1 2.0	
10	-5	9.0 - 11.0 (ML), SILT, some clay, trace sand, gray, moist, stiff.	ML	9.0	20.1		3	2 IN SS	14 - 8 - 7 - 7	15 1.6 2.0	
10	5	11.0 - 13.0 (MH), CLAYEY SILT, trace gravel; gray, moist to wet, firm.	MH	-5.4	0.0		4	2 IN SS	4 - 3 - 4 - 4	7 1.1 2.0	
10	15	13.0 - 14.6 (CL), CLAY, varved and bedded; orange brown, cohesive, moist, stiff.	CL	13.0	0.0		5	2 IN SS	6 - 6 - 5 - 7	11 1.6 2.0	
15	-10	14.6 - 16.9 (CL), CLAY, slightly varved and bedded; orange brown, cohesive, moist, stiff.	CL	-9.0	0.0		1	ROTO SONIC	N/A		
15	5	16.9 - 19.0 (CL), SILTY CLAY, slightly varved and bedded; brown, cohesive, moist, stiff.	CL	-11.3	0.9		6	ROTO SONIC	N/A	4.0 4.0	
15	15	19.0 - 23.2 (CL), SILTY CLAY, trace fine gravel; brown, cohesive, moist, stiff.	CL	-13.4	0.6		7	ROTO SONIC	N/A	5.0 5.0	
20	-15	23.2 - 24.0 (MH), CLAYEY SILT, some fine sand, trace fine gravel; red brown, cohesive, wet, stiff.	MH	19.0	2.7		8	ROTO SONIC	N/A		
20	5	24.0 - 25.9 (MH), CLAYEY SILT, some fine to medium sand, some gravel and cobbles; red brown, wet, stiff.	MH	-17.6	6.0		9	ROTO SONIC	N/A		
25	-20	25.9 - 26.3 (SW), SAND, fine to coarse; red brown, wet, compact.	MH	-18.4	1.4		10	ROTO SONIC	N/A	3.3 5.0	
25	5	26.3 - 29.0 (MH), CLAYEY SILT, trace fine gravel; red brown, cohesive, wet, stiff.	SW	24.0	0.5		11	ROTO SONIC	N/A		
25	25	29.0 - 34.0 (MH), CLAYEY SILT, trace fine sand; red brown, cohesive, wet, soft.	MH	-20.3	0.5		12	ROTO SONIC	N/A		
30	-20	Log continued on next page	MH	26.3	0.8		13	ROTO SONIC	N/A		
30	5		MH	-23.4	2.4		14	ROTO SONIC	N/A		
30	25		MH	29.0	0.5		15	ROTO SONIC	N/A		
30	30				0.4		16	ROTO SONIC	N/A		

RECORD OF BOREHOLE MP16-3

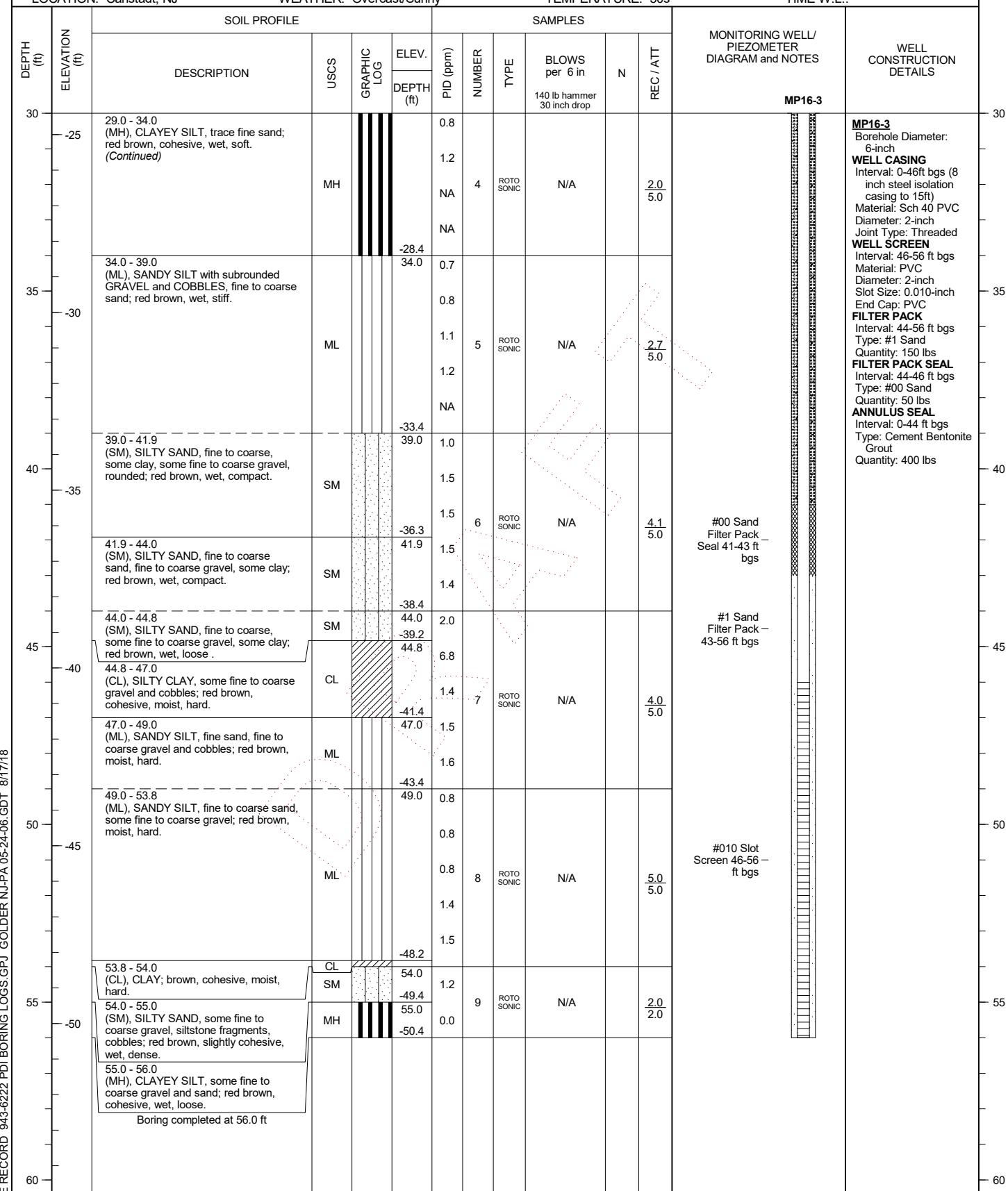
SHEET 2 of 2

PROJECT: Carlstadt OU-3
PROJECT NUMBER: 943-6222.14
DRILLED DEPTH: 56.0 ft
AZIMUTH: N/A
LOCATION: Carlstadt, NJ

DRILL METHOD: HSA/Rotosonic
DRILL RIG: CME-75/Fraste ML SRS
DATE STARTED: 10/27/16
DATE COMPLETED: 10/31/16
WEATHER: Overcast/Sunny

DATUM: NJ State Plane NAD 1983
COORDS: N: 724,823.7 E: 610,884.6
GS ELEVATION: 5.6 ft
TOC ELEVATION: 5.1 ft
TEMPERATURE: 50s

INCLINATION: -90
DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:





**Golder
associates**

WELL DEVELOPMENT FIELD RECORD



**Golder
Associates**

WELL DEVELOPMENT FIELD RECORD

JOB NAME	<u>Castiota</u>	JOB NO.	<u>943-6222-14</u>	WELL NO.	<u>MP16-1</u>
DEVELOPED BY	<u>WFS</u>	DATE OF INSTALL.	<u>11/21/16</u>	SHEET	<u>1</u> of <u>1</u>
STARTED DEVEL.	<u>11/22/16</u>	COMPLETED DEVEL.	<u>11/22/16</u>		<u>1355</u>
W.L. BEFORE DEVEL.	<u>41.79</u>	DATE	<u>11/22/16</u>	TIME	<u>0945</u>
DEPTH	<u>45.33'</u>	DATE	<u>45.33'</u>	TIME	<u>44.33'</u>
WELL DEPTH: BEFORE DEVEL.	<u>45.33'</u>	AFTER DEVEL.	<u>45.35</u>	WELL DIA. (In)	<u>2</u>
STANDING WATER COLUMN (FT.)	<u>44.33'</u>	STANDING WELL VOLUME	<u>6.60</u>	gal.	
SCREEN LENGTH	<u>10'</u>	DRILLING WATER LOSS	<u>Unknown</u>	gal.	

DEVELOPMENT METHOD: Pumping with water pump

NOTES: Well very clear from start - Drew down very quickly and ran dry. Began to pump very silty water off of bottom before drying out 1035 - Water flows intermittently as it recharges (flowing very slow ~300 ml/min)



**Golder
Associates**

WELL DEVELOPMENT FIELD RECORD

JOB NAME	<u>Carlstadt</u>			JOB NO.	<u>9436222.14</u>			WELL NO.	<u>MP16-1</u>		
DEVELOPED BY	<u>Summit Drilling</u>			DATE OF INSTALL.	<u>11/2/16</u>			SHEET	<u>1</u>	of	<u>1</u>
STARTED DEVEL.	<u>11/2/16</u>			COMPLETED DEVEL.	<u>NA</u>						
	DATE	TIME			DATE	TIME			DATE	TIME	
W.L. BEFORE DEVEL.	<u>1.60</u>	<u>11/2/16</u>	<u>1405</u>	W.L. AFTER DEVEL.	<u>NA</u>	<u>/</u>	<u>NA</u>		<u>NA</u>	<u>/</u>	<u>NA</u>
	DEPTH	DATE	TIME		DEPTH	DATE	TIME		DEPTH	DATE	TIME
WELL DEPTH: BEFORE DEVEL.	<u>47.80</u>	<u>(Sticker ht.)</u>		1.80ft)	AFTER DEVEL.	<u>-</u>			WELL DIA. (In)	<u>2"</u>	
STANDING WATER COLUMN (FT.)				STANDING WELL VOLUME	<u>-</u>				gal.		
SCREEN LENGTH	<u>35'-45'</u>	<u>\$ 36</u>	<u>46 ft</u>	DRILLING WATER LOSS	<u>-</u>				gal.		

DEVELOPMENT METHOD: overpumping / surging

NOTES: NM - water level meter not working properly



**Golder
Associates**

WELL DEVELOPMENT FIELD RECORD

JOB NAME	Carlstadt		
DEVELOPED BY	Summit Drilling		
STARTED DEVEL.	10/2/16	TIME	1405 ⁺
W.L. BEFORE DEVEL.	7.20	DATE	11/2/16 1400
DEPTH	DATE	TIME	
WELL DEPTH: BEFORE DEVEL.	57.75	STICKUP HEIGHT	1.55
STANDING WATER COLUMN (FT.)	50.55	AFTER DEVEL.	
SCREEN LENGTH	46-56 ft	STANDING WELL VOLUME	gal.
		DRILLING WATER LOSS	gal.
JOB NO.	9436222.14		
DATE OF INSTALL.	10/31/16		
COMPLETED DEVEL.	11/4/16 1 1345		
DATE	TIME		
W.L. AFTER DEVEL.	8.1	DATE	11/4/16 1 1350
DEPTH	DATE	TIME	
WELL DIA. (In)	2"		

DEVELOPMENT METHOD: overpumping / Emergency

NOTES: nm - water level meter not working properly.



 Golder
Associates

WELL DEVELOPMENT FIELD RECORD

JOB NAME	Carlstadt		
DEVELOPED BY	Summit Drilling		
STARTED DEVEL.	11/4/16 / 1000		
	DATE	TIME	
W.L. BEFORE DEVEL.	NM	11/4/16	1 -
	DEPTH	DATE	TIME
WELL DEPTH: BEFORE DEVEL.	@ 46 45.65		
STANDING WATER COLUMN (FT.)			
SCREEN LENGTH	36-46		

JOB NO.	9436222.14	WELL NO.	MP16-2
DATE OF INSTALL.	11/3/16	SHEET	1 of 1
COMPLETED DEVEL.	11/4/16	/	1320
	DATE	TIME	
W.L. AFTER DEVEL.	NM	11/4/16	1 -
	DEPTH	DATE	TIME
AFTER DEVEL.			
STANDING WELL VOLUME	N/A gal.		
DRILLING WATER LOSS	N/A gal.		

DEVELOPMENT METHOD: Over pumping / surging

NOTES: Water level meter not working properly

Form A
Monitoring Well Certification – As-Built Certification

Name of Permittee: Summit Drilling Co., Inc.

Name of Facility: CAROLINA FRT CARRIERS

Location: 256 PATERSON PLK RD

CERTIFICATION

Well permit number (as assigned by NJDEP's Bureau of Water Allocation):	<u>E201612575</u>
Owner's well number (As shown on the application):	<u>IP-16-2</u>
Well completion date:	<u>11/1/2016</u>
Distance from top of casing (cap off) to ground surface (one-hundredth of a foot):	<u>0</u>
Total depth of well to the nearest ½ foot:	<u>45</u>
Depth to top of screen from top of casing (one-hundredth of a foot):	<u>35</u>
Screen length (or length of open hole in feet):	<u>10</u>
Screen or slot size:	<u>.010</u>
Screen or slot material:	<u>PVC</u>
Casing material (PVC, Steel or other-specify):	<u>PVC</u>
Casing diameter (inches):	<u>2</u>
Static water level from top of casing at the time of installation (one-hundredth of a foot):	<u>38</u>
Yield (gallons per minute):	<u>1</u>
Development technique (specify):	<u>Pump</u>
Length of time well was developed/pumped or bailed:	<u>1 Hr</u>

Authentication

I certify under penalty of law that I have personally examined and familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

William Shinn
Driller's Name (type or print)


Driller's Signature

0001587
Certification or License No.

Corporate Seal

.....
Certification by Executive Officer or Duly Authorized Representative

Name (type or print)

Signature

Title

Date



New Jersey Department of Environmental Protection
Site Remediation Program

**MONITORING WELL CERTIFICATION FORM A - AS-BUILT
CERTIFICATION**

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: _____
List all AKAs: _____
Street Address: _____
Municipality: _____ (Township, Borough or City)
County: _____ Zip Code: _____
Program Interest (PI) Number(s): _____ Case Tracking Number(s): _____

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner _____
2. Well Location (Street Address) _____
3. Well Location (Municipal Block and Lot) Block# _____ Lot # _____

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing):.. _____
2. Site Well Number as shown on application or plans): _____
3. Well Completion Date: _____
4. Distance from Top of Casing (cap off) to ground surface (nearest 0.01'): _____
5. Total Depth of Well to the nearest ½ foot: _____
6. Depth to Top of Screen (or top of open hole) from top of casing (nearest 0.01'): _____
7. Screen Length (or length of open hole) in feet: _____
8. Screen or Slot Size: _____
9. Screen or Slot Material: _____
10. Casing Material (PVC, steel, or other – specify): _____
11. Casing Diameter (inches): _____
12. Static Water Level from top of casing at the time of installation (nearest 0.01'): _____
13. Yield (gallons per minute): _____
14. Development Techinque (specify): _____
15. Length of Time well is developed/pumped or bailed (hours and minutes): _____

Form A
Monitoring Well Certification – As-Built Certification

Name of Permittee: Summit Drilling Co., Inc.

Name of Facility: CAROLINA FRT CARRIERS

Location: 256 PATERSON PLK RD

CERTIFICATION

Well permit number (as assigned by NJDEP's Bureau of Water Allocation):	E201612573
Owner's well number (As shown on the application):	MP16-2
Well completion date:	11/2/2016
Distance from top of casing (cap off) to ground surface (one-hundredth of a foot):	0
Total depth of well to the nearest ½ foot:	46
Depth to top of screen from top of casing (one-hundredth of a foot):	36
Screen length (or length of open hole in feet):	10
Screen or slot size:	.010
Screen or slot material:	PVC
Casing material (PVC, Steel or other-specify):	PVC
Casing diameter (inches):	2
Static water level from top of casing at the time of installation (one-hundredth of a foot):	38
Yield (gallons per minute):	1
Development technique (specify):	Pump
Length of time well was developed/pumped or bailed:	1 Hr

Authentication

I certify under penalty of law that I have personally examined and familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

William Shinn
Driller's Name (type or print)


Driller's Signature

0001587
Certification or License No.

Corporate Seal

.....
Certification by Executive Officer or Duly Authorized Representative

Name (type or print)

Signature

Title

Date

Form A
Monitoring Well Certification – As-Built Certification

Name of Permittee: Summit Drilling Co., Inc.

Name of Facility: CAROLINA FRT CARRIERS

Location: 256 PATERSON PLK RD

CERTIFICATION

Well permit number (as assigned by NJDEP's Bureau of Water Allocation):	E201612574
Owner's well number (As shown on the application):	MP16-3
Well completion date:	10/31/2016
Distance from top of casing (cap off) to ground surface (one-hundredth of a foot):	0
Total depth of well to the nearest ½ foot:	56
Depth to top of screen from top of casing (one-hundredth of a foot):	46
Screen length (or length of open hole in feet):	10
Screen or slot size:	.010
Screen or slot material:	PVC
Casing material (PVC, Steel or other-specify):	PVC
Casing diameter (inches):	2
Static water level from top of casing at the time of installation (one-hundredth of a foot):	38
Yield (gallons per minute):	1
Development technique (specify):	Pump
Length of time well was developed/pumped or bailed:	1 Hr

Authentication

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William Shinn
Driller's Name (type or print)


Driller's Signature

0001587
Certification or License No.

Corporate Seal

.....
Certification by Executive Officer or Duly Authorized Representative

Name (type or print)

Signature

Title

Date



New Jersey Department of Environmental Protection
Site Remediation Program

Monitoring Well Certification Form B - Location Certification

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: 216 Paterson Plank Road PRP Group

List all AKAs: 216 Paterson Plank Road NPL Site

Street Address: 216 Paterson Plank Road

Municipality: Borough of Carlstadt (Township, Borough or City)

County: Bergen County Zip Code: 07072

Program Interest (PI) Number(s): Case Tracking Number(s):

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner 216 Paterson Plank Road PRP Group

2. Well Location (Street Address) 256 Paterson Plank Road

3. Well Location (Municipal Block and Lot) Block# 124 Lot # 6

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201612572

2. Site Well Number (As shown on application or plans): MP 16-1

3. Geographic Coordinate NAD 83 to nearest 1/10 of a second:

Longitude: West 074° 04' 14.95" Latitude: North 40° 49' 21.00"

4. New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 724,822' East 610,898'

5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 5.08' (NAVD-88)*

6. Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Inner casing elevation of existing onsite monitoring well MP-01 (Permit No.E201100537) per published Form-B certification as provided dated February 28, 2011, prepared by Michael R. Vargo, PLS

7. Significant observations and notes:

* Elevation of inner casing of existing onsite well MP-01 referenced to NGVD-29 ~ values converted to NAVD-88 via NGS CORPSCON Software (-1.04')

SECTION D. LAND SURVEYOR'S CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL



07/08/17

Professional Land Surveyor's Signature:

Surveyor's Name: Michael P. Ferschman, PLS License Number: NJ 24GS04322100

Mailing Address Montville Office Park, 150 River Road; Building D-4B

City/Town: Montville State New Jersey Zip Code: 07045

Phone Number (973)-879-4214 Ext.: Fax:



New Jersey Department of Environmental Protection
Site Remediation Program

Monitoring Well Certification Form B - Location Certification

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: 216 Paterson Plank Road PRP Group

List all AKAs: 216 Paterson Plank Road NPL Site

Street Address: 216 Paterson Plank Road

Municipality: Borough of Carlstadt (Township, Borough or City)

County: Bergen County Zip Code: 07072

Program Interest (PI) Number(s): Case Tracking Number(s):

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner 216 Paterson Plank Road PRP Group

2. Well Location (Street Address) 256 Paterson Plank Road

3. Well Location (Municipal Block and Lot) Block# 124 Lot # 6

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201612573

2. Site Well Number (As shown on application or plans): MP 16-2

3. Geographic Coordinate NAD 83 to nearest 1/10 of a second:

Longitude: West 074 04' 14.93" Latitude: North 40 49' 20.84"

4. New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 724,806' East 610,901'

5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 5.08' (NAVD-88)*

6. Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Inner casing elevation of existing onsite monitoring well MP-01 (Permit No.E201100537) per published Form-B certification as provided dated February 28, 2011, prepared by Michael R. Vargo, PLS

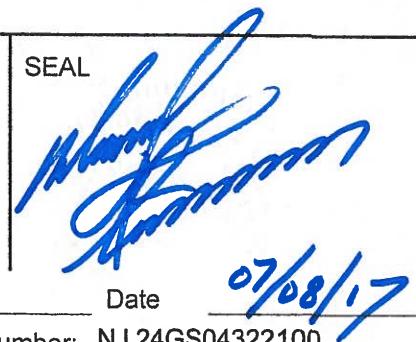
7. Significant observations and notes:

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Date 07/08/17

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New Jersey Department of Environmental Protection
Site Remediation Program

Monitoring Well Certification Form B - Location Certification

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: 216 Paterson Plank Road PRP Group

List all AKAs: 216 Paterson Plank Road NPL Site

Street Address: 216 Paterson Plank Road

Municipality: Borough of Carlstadt (Township, Borough or City)

County: Bergen County Zip Code: 07072

Program Interest (PI) Number(s): Case Tracking Number(s):

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner 216 Paterson Plank Road PRP Group

2. Well Location (Street Address) 256 Paterson Plank Road

3. Well Location (Municipal Block and Lot) Block# 124 Lot # 6

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201612574

2. Site Well Number (As shown on application or plans): MP 16-3

3. Geographic Coordinate NAD 83 to nearest 1/10 of a second:

Longitude: West 074 04' 15.13" Latitude: North 40 49' 21.01"

4. New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 724,824' East 610,885'

5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 5.12' (NAVD-88)*

6. Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Inner casing elevation of existing onsite monitoring well MP-01 (Permit No.E201100537) per published Form-B certification as provided dated February 28, 2011, prepared by Michael R. Vargo, PLS

7. Significant observations and notes:

* Elevation of inner casing of existing onsite well MP-01 referenced to NGVD-29 ~ values converted to NAVD-88 via NGS CORPSCON Software (-1.04')

SECTION D. LAND SURVEYOR'S CERTIFICATION

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Professional Land Surveyor's Signature:

Surveyor's Name: Michael P. Ferschman, PLS License Number: NJ 24GS04322100

Mailing Address Montville Office Park, 150 River Road; Building D-4B

City/Town: Montville State: New Jersey Zip Code: 07045

Phone Number (973)-879-4214 Ext.: Fax:

SEAL

Date

07/08/17



New Jersey Department of Environmental Protection
Site Remediation Program

Monitoring Well Certification Form B - Location Certification

Date Stamp
(For Department use only)

SECTION A. SITE NAME AND LOCATION

Site Name: 216 Paterson Plank Road PRP Group

List all AKAs: 216 Paterson Plank Road NPL Site

Street Address: 216 Paterson Plank Road

Municipality: Borough of Carlstadt (Township, Borough or City)

County: Bergen County Zip Code: 07072

Program Interest (PI) Number(s): Case Tracking Number(s):

SECTION B. WELL OWNER AND LOCATION

1. Name of Well Owner 216 Paterson Plank Road PRP Group

2. Well Location (Street Address) 256 Paterson Plank Road

3. Well Location (Municipal Block and Lot) Block# 124 Lot # 6

SECTION C. WELL LOCATION SPECIFICS

1. Well Permit Number (This number must be permanently affixed to the well casing): E201612575

2. Site Well Number (As shown on application or plans): IP 16-2

3. Geographic Coordinate NAD 83 to nearest 1/10 of a second:

Longitude: West 074 04' 15.08" Latitude: North 40 49' 21.00"

4. New Jersey State Plane Coordinates NAD 83 to nearest 10 feet:

North 724,823' East 610,889'

5. Elevation of Top of Inner Casing (cap off) at reference mark (nearest 0.01'): 5.03' (NAVD-88)*

6. Source of elevation datum (benchmark, number/description and elevation/datum. If an on-site datum is used, identify here, assume datum of 100', and give approximated actual elevation.)

Inner casing elevation of existing onsite monitoring well MP-01 (Permit No.E201100537) per published Form-B certification as provided dated February 28, 2011, prepared by Michael R. Vargo, PLS

7. Significant observations and notes:

* Elevation of inner casing of existing onsite well MP-01 referenced to NGVD-29 ~ values converted to NAVD-88 via NGS CORPSCON Software (-1.04')

SECTION D. LAND SURVEYOR'S CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

SEAL

Date

07/08/17

Professional Land Surveyor's Signature:

Surveyor's Name: Michael P. Ferschman, PLS License Number: NJ 24GS04322100

Mailing Address Montville Office Park, 150 River Road; Building D-4B

City/Town: Montville State: New Jersey Zip Code: 07045

Phone Number (973)-879-4214 Ext.: Fax:

APPENDIX B

Data Usability Summary Report

This report presents the findings of the data quality review performed on the analyses of environmental samples collected at the 216 Paterson Plank Road Site located in Carlstadt, New Jersey (Site). Samples were collected from July 25, 2017 to May 16, 2018¹. The chemical data for samples collected at the site were assessed to identify quality issues which could affect the use of the data for decision making purposes.

During the sampling events, twenty-seven (27) primary samples, as well as four (4) field duplicates, eight (8) trip blanks, four (4) rinsate blanks, four (4) matrix spikes (MS) and four (4) matrix spike duplicates (MSD) for quality control (QC) purposes, were collected for chemical analysis. The samples were analyzed for TCL VOCs, 1,4-dioxane as an SVOC, total metals and dissolved metals, hexavalent chromium, carbon dioxide as a dissolved gas, and the following monitored natural attenuation (MNA) parameters: alkalinity, chloride, sulfate, total iron, ferrous and ferric iron, and total organic carbon (TOC). Samples were analyzed using the following USEPA methods:

- TCL VOCs (Trace) and 1,4-dioxane as an SVOC, following USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analysis; Multi-Media, Multi-Concentration, SOM02.3 (September 2015) and SOM02.4 (October 2016);
- Total and Dissolved Metals following USEPA CLP SOW for Inorganic Superfund Methods; Multi-Media, Multi-Concentration, ISM02.3 (September 2015) and ISM02.4 (October 2016);
- Hexavalent Chromium following USEPA SW-846 Method 7196A; Chromium, Hexavalent (Colorimetric), Revision 1, (July 1992);
- Total Iron following USEPA SW-846 Method 6010C, Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) (November 2000);
- Carbon Dioxide following USEPA protocol RSK-175 “Sample Preparation and Calculations for Dissolved Gas Analysis in Water Samples Using a GC Headspace Equilibration Technique” (August 1994);
- Alkalinity following Standard Method (SM) 2320B Titration Method (1997);
- Ferrous and Ferric Iron following SM 3500 Fe D Phenanthroline Method (1997);
- Chloride and Sulfate following USEPA Methods for Chemical Analysis of Water and Wastes (MCAWW) Method 300.0 Determination of Inorganic Anions by Ion Chromatography (August 1993); and,
- TOC following SM 5310B Persulfate-Ultraviolet or Heated-Persulfate Oxidation Method (2000).

TestAmerica Laboratories, Inc. of South Burlington, Vermont and Edison, New Jersey performed the analyses following the above method guidelines. Information regarding the sample point identifications, analytical parameters, QC samples, sampling dates, and contract laboratory sample delivery group (SDG) designations are summarized in Table B-1.

¹ The data quality review for samples collected in December 2016 was included in the Northern Area Draft Final Design Report.

The data quality review followed the USEPA Region II data validation standard operating procedures (SOPs) listed below:

- USEPA Region II SOP No. HW-34A, Revision 0, SOM02.2, Trace Volatile Data Validation, July 2015, for Trace VOCs and carbon dioxide;
- USEPA Region II SOP No. HW-35A, Revision 0, SOM02.2, Semivolatile Data Validation, July 2015, for SVOCs;
- USEPA Region II SOP No. HW-3A, Revision 0, ISM02.2, ICP-AES Data Validation, July 2015, for metals, chloride, sulfate, alkalinity, and TOC;
- USEPA Region II SOP No. HW-3C, Revision 0, ISM02.2, Mercury and Cyanide Data Validation, July 2015, for Mercury.

Chemical results for the samples collected at the site were qualified based on outlying precision or accuracy parameters or on the basis of professional judgment. The following definitions provide brief explanations of the qualifiers which may have been assigned to data during the data review process:

- U The analyte was analyzed for, but was not detected at a level greater than or equal to the level of the adjusted contract required quantitation limit (CRQL) for sample and method.
- J The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample (due either to the quality of the data generated because certain quality control criteria were not met, or the concentration of the analyte was below the CRQL).
- J- The result is an estimated quantity, but the result may be biased low.
- J+ The result is an estimated quantity, but the result may be biased high.
- UJ The analyte was not detected at a level greater than or equal to the adjusted CRQL. However, the reported adjusted CRQL is approximate and may be inaccurate or imprecise.
- R The sample results are unusable due to the quality of the data generated because certain criteria were not met. The analyte may or may not be present in the sample.

In general, the data generated during the sampling events met the QC criteria established in the respective methods and Region II data validation SOPs. The following bulleted item highlights qualifications to specific parameters. Although these qualifications were applied to some of the samples collected during the investigation, the qualifications may not have been required or applied to all samples. Table B-2 details all qualifications applied to data, with applicable qualifier comments.

Volatile Organic Compounds

- Select detected VOC results were qualified as estimated (J) and non-detects were rejected (R) when the analysis was performed outside of holding time.
- Select VOC results were qualified as non-detect (U) and reported at the CRQL, or the CRQL was raised to the sample concentration, due to rinsate, trip, method, or storage blank contamination.
- Select VOC results were qualified as estimated (J/UJ) when field duplicate precision was above QC criteria.
- Select results for 1,2,3-trichlorobenzene were rejected when the initial calibration relative response factor (RRF) was below QC criteria.
- Select VOC results were qualified as estimated biased low (J-) or rejected (R) when surrogate recoveries were less than 10%.
- Select VOC results for MP16-1 and MP16-02 were qualified as estimated non-detect (UJ) or estimated biased low (J-) when surrogate recoveries were below QC criteria.
- Select VOC results were not reportable when surrogate recoveries were outside of QC criteria, and either the initial or the reanalysis surrogate recoveries were closer to QC criteria.

Semivolatile Organic Compounds

- Select 1,4-dioxane results were qualified as estimated (J) when field duplicate precision was above QC criteria.

Metals

- Select total iron, total nickel, and dissolved antimony results were qualified as estimated (J) or estimated non-detect (UJ) when field duplicate precision was above QC criteria.
- Select total and dissolved metals were qualified as estimated biased low (J-), or non-detect (U) and reported at the CRQL due to method blank contamination.
- Select total and dissolved metals were qualified as estimated biased high (J+), or non-detect (U) and reported at the CRQL due to rinsate blank contamination.
- Select total and dissolved mercury results were qualified as estimated biased low (J-) or estimated non-detect (UJ) when samples were analyzed outside of hold time.

Monitored Natural Attenuation Parameters

- Select chloride and sulfate results were qualified as estimated (J) due to rinsate blank contamination.
- Select chloride and sulfate results were qualified as estimated biased high (J+), estimated biased low (J-), or estimated (J) when MS/MSD recoveries were outside of QC criteria.
- Chloride result for MW-22D collected in July and September 2017 were qualified as estimated (J) when laboratory control sample duplicate (LCSD) recoveries were below QC criteria.
- Select sulfate results were qualified as estimate (J) when laboratory duplicate precision was above QC criteria.
- Select chloride and sulfate results were qualified as estimated (J) when field duplicate precision was above QC criteria.
- Ferrous and ferric iron are optimally analyzed in the field within 15 minutes of sample collection. Ferrous and ferric iron results were qualified as estimated (J/UJ) since the field parameter was analyzed in the laboratory outside of holding time.
- Select ferrous iron results were qualified as estimated (UJ) and reported at the CRQL due to rinsate blank contamination and due to analysis holding time.

- Select ferric iron results were qualified as estimated (J) when field duplicate precision was above QC criteria and due to analysis holding time.
- The TOC result for MW-21R collected during the September 2017 sampling event was qualified as non-detect (U) and reported at the CRQL due to rinsate blank contamination.
- Select alkalinity results were qualified as estimated (J) due to rinsate blank contamination.
- Select carbon dioxide results were qualified as estimated (UJ) due to pH outside of the method required criteria.

Based on the data quality assessment, the analytical data for the samples collected during the pre-design investigation (excluding rejected results) were determined to be acceptable for their intended use. Acceptable levels of accuracy and precision, based on laboratory control samples (LCS), MS/MSD, field duplicate, laboratory duplicate and surrogate recoveries, were achieved for the data. In addition, the data completeness (i.e. the ratio of the amount of valid data obtained to the amount expected, including estimated data (J/UJ/J+/J-) was 94.8%.

**SAMPLE AND ANALYSIS SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

Lab SDG	Field ID	Matrix	Sample Date	VOCs by SOM02.3/ ISM02.4	1,4-Dioxane as SVOC by SOM02.3/ ISM02.4	Total Iron by SW846 6010C	Total Metals + Hg by ISM02.3/ ISM02.4	Dissolved Metals + Hg by ISM02.3/ ISM02.4	Alkalinity by SM2320B	Chloride by MCAWW 300.0	Sulfate by MCAWW 300.0	Carbon Dioxide by RSK-175	TOC by SM5310B	Ferrous and Ferric Iron SM3500 FE D	Hexavalent Chromium by SW846 7196A	MS/MSD	Field Duplicate Association
Primary Wells																	
460-148709-1	IP-16-2	WG	1/18/2018	x	x	x		x	x	x	x	x	x	x	x	x	
460-148709-1	MP-16-2	WG	1/18/2018	x	x	x		x	x	x	x	x	x	x	x	x	
460-148709-1	MP-16-3	WG	1/18/2018	x	x	x		x	x	x	x	x	x	x	x	x	x
460-148709-1	MW-21R	WG	1/18/2018	x	x	x		x	x	x	x	x	x	x	x	x	
460-148709-1	MP-16-1	WG	1/19/2018	x	x	x		x	x	x	x	x	x	x	x	x	
460-148709-1	MW-22D	WG	1/19/2018	x	x	x		x	x	x	x	x	x	x	x	x	
460-137886-1	IP16-2	WG	7/25/2017	x	x	x	x		x	x	x	x	x	x	x	x	
460-137886-1	MP16_1	WG	7/25/2017	x	x	x	x		x	x	x	x	x	x	x	x	
460-137886-1	MP16_2	WG	7/25/2017	x	x	x	x		x	x	x	x	x	x	x	x	
460-137886-1	MP16_3	WG	7/25/2017	x	x	x	x		x	x	x	x	x	x	x	x	x
460-137886-1	MW-21D	WG	7/25/2017	x	x	x	x		x	x	x	x	x	x	x	x	
460-137886-1	MW-21R	WG	7/25/2017	x	x	x	x		x	x	x	x	x	x	x	x	
460-137886-1	MW-22D	WG	7/27/2017	x	x	x	x		x	x	x	x	x	x	x	x	
460-141001-1	IP16-2	WG	9/14/2017	x	x	x		x	x	x	x	x	x	x	x	x	
460-141001-1	MP16-1	WG	9/14/2017	x	x	x		x	x	x	x	x	x	x	x	x	x
460-141001-1	MP16-2	WG	9/14/2017	x	x	x		x	x	x	x	x	x	x	x	x	
460-141001-1	MP16-3	WG	9/14/2017	x	x	x		x	x	x	x	x	x	x	x	x	
460-141001-1	MW-21D	WG	9/14/2017	x	x	x		x	x	x	x	x	x	x	x	x	
460-141001-1	MW-21R	WG	9/14/2017	x	x	x		x	x	x	x	x	x	x	x	x	
460-141001-1	MW-22D	WG	9/14/2017	x	x	x		x	x	x	x	x	x	x	x	x	
460-156138-1	IP_16-2	WG	5/14/2018	x	x		x	x			x	x	x	x	x		
460-156138-1	MP-16-01	WG	5/15/2018	x	x		x	x			x	x	x	x	x		
460-156138-1	MP-16-02	WG	5/16/2018	x	x		x	x			x	x	x	x	x		
460-156138-1	MP-16-03	WG	5/16/2018	x	x		x	x			x	x	x	x	x		
460-156138-1	MW-21R	WG	5/16/2018	x	x		x	x			x	x	x	x	x		
460-156138-1	MW-22D	WG	5/16/2018	x	x		x	x			x	x	x	x	x		
460-156138-1	MW-21D	WG	5/16/2018	x	x		x	x			x	x	x	x	x	x	
Quality Control Samples																	
460-156138-1	FDGW_051618	WG	5/16/2018	x	x		x	x	x	x	x	x	x	x	x		MW-21D
460-137886-1	FDGW_072517	WG	7/25/2017	x		x	x		x	x	x	x	x	x	x	x	IP16-2
460-141001-1	FDGW_091417	WG	9/14/2017	x		x		x	x	x	x	x	x	x	x	x	MP16-3
460-148709-1	FDGW-011818	WG	1/18/2018	x	x	x		x	x	x	x	x	x	x	x	x	IP-16-2
460-156138-1	RBGW_051518	WQ	5/15/2018	x	x		x	x	x	x	x	x	x	x	x		
460-137886-1	RBGW_072517	WQ	7/25/2017	x		x	x		x	x	x	x	x	x	x	x	
460-141001-1	RBGW_091417	WQ	9/14/2017	x		x		x	x	x	x	x	x	x	x	x	
460-148709-1	RBGW-011918	WQ	1/19/2018	x	x	x		x	x	x	x	x	x	x	x	x	
460-156138-1	TBGW_051418	WQ	5/14/2018	x													
460-156138-1	TBGW_051518	WQ	5/15/2018	x													
460-156138-1	TBGW_051618	WQ	5/16/2018	x													
460-137886-1	TBGW_072517	WQ	7/25/2017	x													
460-137886-1	TBGW_072717	WQ	7/27/2017	x													
460-141001-1	TBGW_091417	WQ	9/14/2017	x													
460-148709-1	TBGW-011818	WQ	1/18/2018	x													
460-148709-1	TBGW-011918	WQ	1/19/2018	x													

Abbreviations:

Hg - Mercury
 MS/MSD - Matrix Spike/Matrix Spike Duplicate
 QC - Quality Control
 SDG - Sample Delivery Group

SVOCs - Semivolatile Organic Compounds

TOC - Total Organic Carbon

VOCs - Volatile Organic Compounds

WG - Groundwater

WQ - Water Quality

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 Checked by: AMZ 8/15/18

**DATA QUALIFIER SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

SDG	Field ID	Analyte	New Result	New CRQL	Qual	Comments
460-137886-1	FDGW_072517	2-Butanone	-	-	UJ	Field duplicate RPD above QC limits
460-137886-1	FDGW_072517	Carbon Disulfide	2.5	-	U	Storage blank contamination
460-137886-1	FDGW_072517	Carbonate Alkalinity	-	-	J	Field duplicate RPD above QC limits
460-137886-1	FDGW_072517	Chloride	-	-	J	Rinsate blank contamination
460-137886-1	FDGW_072517	Ferric Iron	-	-	J	Field duplicate RPD above QC limits
460-137886-1	FDGW_072517	Ferrous Iron	-	-	J	Analyzed outside of holding time
460-137886-1	FDGW_072517	Total Iron (ISM02.3)	-	-	J	Field duplicate RPD above QC limits
460-137886-1	FDGW_072517	Total Iron (SW6010C)	-	-	J	Field duplicate RPD above QC limits
460-137886-1	IP16-2	2-Butanone	-	-	J	Field duplicate RPD above QC limits
460-137886-1	IP16-2	Carbonate Alkalinity	-	-	J	Field duplicate RPD above QC limits
460-137886-1	IP16-2	Chloride	-	-	J	Rinsate blank contamination
460-137886-1	IP16-2	Ferric Iron	-	-	J	Field duplicate RPD above QC limits
460-137886-1	IP16-2	Ferrous Iron	-	-	J	Analyzed outside of holding time
460-137886-1	IP16-2	Total Iron (ISM02.3)	-	-	J	Field duplicate RPD above QC limits
460-137886-1	IP16-2	Total Iron (SW6010C)	-	-	J	Field duplicate RPD above QC limits
460-137886-1	MP16_1	1,1-Dichloroethene	-	-	UJ	Surrogate recovery below QC limits
460-137886-1	MP16_1	Alkalinity	-	-	J	Rinsate blank contamination
460-137886-1	MP16_1	Chloride	-	-	J	Rinsate blank contamination
460-137886-1	MP16_1	cis-1,2-Dichloroethene	-	-	UJ	Surrogate recovery below QC limits
460-137886-1	MP16_1	Ferrous Iron	-	-	J	Analyzed outside of holding time
460-137886-1	MP16_1	Total Nickel	40	-	U	Rinsate blank contamination
460-137886-1	MP16_1	Sulfate	-	-	J	Rinsate blank contamination
460-137886-1	MP16_1	trans-1,2-Dichloroethene	-	-	UJ	Surrogate recovery below QC limits
460-137886-1	MP16_2	Carbon Disulfide	0.5	-	U	Storage blank contamination
460-137886-1	MP16_2	Chloride	-	-	J	Rinsate blank contamination
460-137886-1	MP16_2	Ferrous Iron	-	-	J	Analyzed outside of holding time
460-137886-1	MP16_2	Total Nickel	40	-	U	Rinsate blank contamination
460-137886-1	MP16_2	Sulfate	-	-	J	Rinsate blank contamination
460-137886-1	MP16_3	Alkalinity	-	-	J	Rinsate blank contamination
460-137886-1	MP16_3	Carbon Disulfide	0.5	-	U	Storage blank contamination
460-137886-1	MP16_3	Total Chromium	10	-	U	Rinsate blank contamination
460-137886-1	MP16_3	Ferrous Iron	-	-	UJ	Analyzed outside of holding time
460-137886-1	MP16_3	Total Nickel	40	-	U	Rinsate blank contamination
460-137886-1	MP16_3	Sulfate	-	-	J	Rinsate blank contamination
460-137886-1	MP16_3	Chloride	-	-	J	MS/MSD recoveries above QC limits
460-137886-1	MW-21D	Acetone	25	-	U	Rinsate blank contamination
460-137886-1	MW-21D	Bromomethane	2.5	-	U	Method blank contamination
460-137886-1	MW-21D	Carbon Disulfide	2.5	-	U	Storage blank contamination
460-137886-1	MW-21D	Chloride	-	-	J	MS/MSD recoveries above QC limits
460-137886-1	MW-21D	Total Chromium	10	-	U	Rinsate blank contamination
460-137886-1	MW-21D	Ferrous Iron	-	-	UJ	Analyzed outside of holding time
460-137886-1	MW-21D	Sulfate	-	-	J	Rinsate blank contamination
460-137886-1	MW-21R	Acetone	-	8.9	U	Rinsate blank contamination
460-137886-1	MW-21R	Alkalinity	-	-	J	Rinsate blank contamination
460-137886-1	MW-21R	Carbon Disulfide	0.5	-	U	Storage blank contamination
460-137886-1	MW-21R	Chloride	-	-	J	MS/MSD recoveries above QC limits
460-137886-1	MW-21R	Total Chromium	10	-	U	Rinsate blank contamination
460-137886-1	MW-21R	Ferrous Iron	-	-	UJ	Analyzed outside of holding time
460-137886-1	MW-21R	Total Nickel	40	-	U	Rinsate blank contamination
460-137886-1	MW-21R	Sulfate	-	-	J	Rinsate blank contamination
460-137886-1	MW-22D	Acetone	5	-	U	Trip blank contamination
460-137886-1	MW-22D	Carbon Disulfide	0.5	-	U	Storage blank contamination
460-137886-1	MW-22D	Chloride	-	-	J	LCSD recovery below QC limits
460-137886-1	MW-22D	Ferrous Iron	-	-	UJ	Analyzed outside of holding time
460-141001-1	FDGW_091417	1,4-Dioxane	-	-	J	Field duplicate RPD above QC limits
460-141001-1	FDGW_091417	Acetone	5	-	U	Rinsate blank contamination
460-141001-1	FDGW_091417	Chloride	-	-	J+	MS/MSD recoveries above QC limits
460-141001-1	FDGW_091417	Ferric Iron	-	-	J	Field duplicate RPD above QC limits

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Checked by: AMZ 8/15/18

**DATA QUALIFIER SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

SDG	Field ID	Analyte	New Result	New CRQL	Qual	Comments
460-141001-1	FDGW_091417	Ferrous Iron	0.1	-	UJ	Rinsate blank contamination and analyzed outside of holding time
460-141001-1	FDGW_091417	Total Iron	-	-	J	Field duplicate RPD above QC limits
460-141001-1	FDGW_091417	Methylene Chloride	0.5	-	U	Trip blank contamination
460-141001-1	IP16-2	2-Butanone	130	-	U	Rinsate blank contamination
460-141001-1	IP16-2	Acetone	-	200	U	Rinsate blank contamination
460-141001-1	IP16-2	Chloride	-	-	J+	MS/MSD recoveries above QC limits
460-141001-1	IP16-2	Cobalt, Dissolved	50	-	U	Method blank contamination
460-141001-1	IP16-2	Ferrous Iron	-	-	J	Analyzed outside of holding time
460-141001-1	MP16-1	2-Butanone	-	6.9	U	Rinsate blank contamination
460-141001-1	MP16-1	Chloride	-	-	J+	MS/MSD recoveries above QC limits
460-141001-1	MP16-1	Chloroform	0.5	-	U	Rinsate blank contamination
460-141001-1	MP16-1	Ferrous Iron	-	-	UJ	Analyzed outside of holding time
460-141001-1	MP16-1	Methylene Chloride	0.5	-	U	Trip blank contamination
460-141001-1	MP16-2	Acetone	5	-	U	Rinsate blank contamination
460-141001-1	MP16-2	Chloride	-	-	J+	MS/MSD recoveries above QC limits
460-141001-1	MP16-2	Ferrous Iron	0.1	-	UJ	Rinsate blank contamination and analyzed outside of holding time
460-141001-1	MP16-2	Methylene Chloride	0.5	-	U	Trip blank contamination
460-141001-1	MP16-3	1,4-Dioxane	-	-	J	Field duplicate RPD above QC limits
460-141001-1	MP16-3	Acetone	5	-	U	Rinsate blank contamination
460-141001-1	MP16-3	Chloride	-	-	J+	MS/MSD recoveries above QC limits
460-141001-1	MP16-3	Ferric Iron	-	-	J	Field duplicate RPD above QC limits
460-141001-1	MP16-3	Ferrous Iron	-	-	UJ	Analyzed outside of holding time
460-141001-1	MP16-3	Total Iron	-	-	UJ	Field duplicate RPD above QC limits
460-141001-1	MP16-3	Methylene Chloride	0.5	-	U	Trip blank contamination
460-141001-1	MW-21D	Acetone	-	8.1	U	Rinsate blank contamination
460-141001-1	MW-21D	Chloride	-	-	J+	MS/MSD recoveries above QC limits
460-141001-1	MW-21D	Ferrous Iron	0.1	-	UJ	Rinsate blank contamination and analyzed outside of holding time
460-141001-1	MW-21D	Methylene Chloride	-	1.5	U	Trip blank contamination
460-141001-1	MW-21R	Acetone	5	-	U	Rinsate blank contamination
460-141001-1	MW-21R	Chloride	-	-	J+	MS/MSD recoveries above QC limits
460-141001-1	MW-21R	Ferrous Iron	0.1	-	UJ	Rinsate blank contamination and analyzed outside of holding time
460-141001-1	MW-21R	Methylene Chloride	0.5	-	U	Trip blank contamination
460-141001-1	MW-21R	TOC	1	-	U	Rinsate blank contamination
460-141001-1	MW-22D	Acetone	5	-	U	Rinsate blank contamination
460-141001-1	MW-22D	Chloride	-	-	J+	MS/MSD recoveries above QC limits
460-141001-1	MW-22D	Ferrous Iron	-	-	UJ	Analyzed outside of holding time
460-141001-1	MW-22D	Methylene Chloride	0.5	-	U	Trip blank contamination
460-148709-1	FDGW-011818	1,2,3-Trichlorobenzene	-	-	R	Initial Calibration RRF below QC criteria
460-148709-1	FDGW-011818	1,4-Dioxane	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	FDGW-011818	Carbon dioxide	-	-	UJ	pH outside of required criteria
460-148709-1	FDGW-011818	Chloride	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	FDGW-011818	Dissolved Antimony	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	FDGW-011818	Ferric Iron	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	FDGW-011818	Ferric Iron	-	-	J	Analyzed outside of hold time
460-148709-1	FDGW-011818	Ferrous Iron	-	-	J	Analyzed outside of method required holding time
460-148709-1	FDGW-011818	Sulfate	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	FDGW-011818	Total Iron	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	FDGW-011818	Trichloroethene	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	FDGW-011818	VOC initial results	-	-	R	Not reportable because reanalysis surrogate recoveries are closer to QC criteria and reanalysis results are reportable; reanalyzed due to initial surrogate recoveries below QC criteria

Created by: MDS 8/14/18

Checked by: AMZ 8/15/18

**DATA QUALIFIER SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

SDG	Field ID	Analyte	New Result	New CRQL	Qual	Comments
460-148709-1	FDGW-011818	VOC reanalysis results	-	-	-	Reportable because surrogate recoveries are closer to QC criteria than initial analysis
460-148709-1	IP-16-2	1,2,3-Trichlorobenzene	-	-	R	Initial Calibration RRF below QC criteria
460-148709-1	IP-16-2	1,4-Dioxane	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	IP-16-2	Carbon dioxide	-	-	UJ	pH outside of required criteria
460-148709-1	IP-16-2	Chloride	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	IP-16-2	Dissolved Antimony	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	IP-16-2	Ferric Iron	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	IP-16-2	Ferric Iron	-	-	J	Analyzed outside of hold time
460-148709-1	IP-16-2	Ferrous Iron	-	-	J	Analyzed outside of method required holding time
460-148709-1	IP-16-2	Sulfate	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	IP-16-2	Total Iron	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	IP-16-2	Trichloroethene	-	-	J	Field Duplicate RPD above QC criteria
460-148709-1	IP-16-2	VOC initial results	-	-	-	Reportable because surrogate recoveries are closer to QC criteria than reanalysis
460-148709-1	IP-16-2	VOC reanalysis results	-	-	R	Not reportable because initial surrogate recoveries are closer to QC criteria and initial results are reportable; reanalyzed due to initial surrogate recoveries below QC criteria
460-148709-1	MP-16-1	1,2,3-Trichlorobenzene	-	-	R	Initial Calibration RRF below QC criteria
460-148709-1	MP-16-1	Acetone	-	5	U	Trip Blank contamination
460-148709-1	MP-16-1	Carbon Disulfide	0.5	-	U	Method Blank contamination
460-148709-1	MP-16-1	Dissolved Arsenic	10	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Barium	200	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Chromium	10	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Copper	25	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Iron	100	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Lead	10	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Magnesium	-	-	J+	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Manganese	-	-	J+	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Nickel	40	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Potassium	-	-	J+	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Silver	10	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Sodium	-	-	J+	Rinsate Blank contamination
460-148709-1	MP-16-1	Dissolved Zinc	60	-	U	Rinsate Blank contamination
460-148709-1	MP-16-1	Ferric Iron	-	-	UJ	Analyzed outside of hold time
460-148709-1	MP-16-1	Ferrous Iron	-	-	UJ	Analyzed outside of method required holding time
460-148709-1	MP-16-1	Methylene Chloride	0.5	-	U	Rinsate Blank contamination
460-148709-1	MP-16-2	1,2,3-Trichlorobenzene	-	-	R	Initial Calibration RRF below QC criteria
460-148709-1	MP-16-2	Carbon dioxide	-	-	UJ	pH outside of required criteria
460-148709-1	MP-16-2	Ferric Iron	-	-	J	Analyzed outside of hold time
460-148709-1	MP-16-2	Ferrous Iron	-	-	UJ	Analyzed outside of method required holding time
460-148709-1	MP-16-2	VOC initial results	-	-	-	Reportable because surrogate recoveries are closer to QC criteria than reanalysis
460-148709-1	MP-16-2	VOC reanalysis results	-	-	R	Not reportable because initial surrogate recoveries are closer to QC criteria and initial results are reportable; reanalyzed due to initial surrogate recoveries below QC criteria
460-148709-1	MP-16-3	1,2,3-Trichlorobenzene	-	-	R	Initial Calibration RRF below QC criteria
460-148709-1	MP-16-3	Acetone	5	-	U	Trip Blank contamination
460-148709-1	MP-16-3	Ferric Iron	-	-	UJ	Analyzed outside of hold time
460-148709-1	MP-16-3	Ferrous Iron	-	-	J	Analyzed outside of method required holding time

Created by: MDS 8/14/18

Checked by: AMZ 8/15/18

**DATA QUALIFIER SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

SDG	Field ID	Analyte	New Result	New CRQL	Qual	Comments
460-148709-1	MP-16-3	Methylene Chloride	-	0.9	U	Trip Blank contamination
460-148709-1	MP-16-3	Sulfate	-	-	J	Lab Duplicate RPD above QC criteria
460-148709-1	MW-21R	1,2,3-Trichlorobenzene	-	-	R	Initial Calibration RRF below QC criteria
460-148709-1	MW-21R	Acetone	5	-	U	Trip Blank contamination
460-148709-1	MW-21R	Ferric Iron	-	-	J	Analyzed outside of hold time
460-148709-1	MW-21R	Ferrous Iron	-	-	UJ	Analyzed outside of method required holding time
460-148709-1	MW-21R	Methylene Chloride	0.5	-	U	Trip Blank contamination
460-148709-1	MW-22D	1,2,3-Trichlorobenzene	-	-	R	Initial Calibration RRF below QC criteria
460-148709-1	MW-22D	Acetone	-	5.6	U	Trip Blank contamination
460-148709-1	MW-22D	Dissolved Calcium	5000	-	U	Rinsate Blank contamination
460-148709-1	MW-22D	Dissolved Chromium	10	-	U	Rinsate Blank contamination
460-148709-1	MW-22D	Dissolved Copper	25	-	U	Rinsate Blank contamination
460-148709-1	MW-22D	Dissolved Manganese	15	-	U	Rinsate Blank contamination
460-148709-1	MW-22D	Dissolved Sodium	5000	-	U	Rinsate Blank contamination
460-148709-1	MW-22D	Dissolved Zinc	60	-	U	Rinsate Blank contamination
460-148709-1	MW-22D	Ferric Iron	-	-	J	Analyzed outside of hold time
460-148709-1	MW-22D	Ferrous Iron	-	-	UJ	Analyzed outside of method required holding time
460-148709-1	MW-22D	Methylene Chloride	0.5	-	U	Rinsate Blank contamination
460-148709-1	MW-22D	Sulfate	-	-	J	Lab Duplicate RPD above QC criteria
460-156138-1	FDGW_051618	1,1,1-Trichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,1,2,2-Tetrachloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,1,2-Trichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,1-Dichloroethane	-	-	J	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,1-Dichloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,2,3-Trichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,2,4-Trichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,2-Dibromo-3-chloropropane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,2-Dibromoethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,2-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,2-Dichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,2-Dichloropropane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,3-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,4-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	1,4-Dioxane	-	-	J	Field Duplicate RPD above QC criteria
460-156138-1	FDGW_051618	2-Butanone	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	2-Hexanone	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	4-Methyl-2-pentanone	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Acetone	5	-	R	Analyzed outside of hold time; TB contamination
460-156138-1	FDGW_051618	Benzene	-	-	J	Analyzed outside of hold time
460-156138-1	FDGW_051618	Bromochloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Bromodichloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Bromoform	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Bromomethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Carbon Disulfide	0.5	-	R	Analyzed outside of hold time; TB and MB contamination
460-156138-1	FDGW_051618	Carbon Tetrachloride	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Chlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Chloroethane	-	-	J	Analyzed outside of hold time
460-156138-1	FDGW_051618	Chloroform	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Chloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	cis-1,2-Dichloroethene	-	-	J	Analyzed outside of hold time
460-156138-1	FDGW_051618	cis-1,3-Dichloropropene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Cyclohexane	-	-	J	Analyzed outside of hold time
460-156138-1	FDGW_051618	Dibromochloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Dichlorodifluoromethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Dissolved Mercury	-	-	UJ	Analyzed outside of hold time

Created by: MDS 8/14/18

Checked by: AMZ 8/15/18

**DATA QUALIFIER SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

SDG	Field ID	Analyte	New Result	New CRQL	Qual	Comments
460-156138-1	FDGW_051618	Ethylbenzene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Ferric Iron	-	-	J	Analyzed outside of hold time
460-156138-1	FDGW_051618	Ferrous Iron	-	-	J	Analyzed outside of hold time
460-156138-1	FDGW_051618	Freon 113	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Isopropylbenzene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	m,p-Xylenes	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Methyl Acetate	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Methyl Cyclohexane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Methyl tert-Butyl Ether	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Methylene Chloride	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	o-Xylene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Styrene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Sulfate	-	-	J-	MSD recovery below QC criteria; Field Duplicate RPD above QC criteria
460-156138-1	FDGW_051618	Tetrachloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Toluene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Total Antimony	-	-	UJ	MB contamination
460-156138-1	FDGW_051618	Total Chromium	10	-	U	MB contamination
460-156138-1	FDGW_051618	Total Cobalt	50	-	U	MB contamination
460-156138-1	FDGW_051618	Total Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	FDGW_051618	Total Nickel	-	-	J	Field Duplicate RPD above QC criteria
460-156138-1	FDGW_051618	trans-1,2-Dichloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	trans-1,3-Dichloropropene	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Trichloroethene	-	-	J	Analyzed outside of hold time
460-156138-1	FDGW_051618	Trichlorofluoromethane	-	-	R	Analyzed outside of hold time
460-156138-1	FDGW_051618	Vinyl Chloride	-	-	J	Analyzed outside of hold time
460-156138-1	IP_16-2	2-Butanone	25	-	U	Storage Blank contamination
460-156138-1	IP_16-2	Dissolved Mercury	-	-	J-	Analyzed outside of hold time
460-156138-1	IP_16-2	Ferric Iron	-	-	J	Analyzed outside of hold time
460-156138-1	IP_16-2	Ferrous Iron	-	-	J	Analyzed outside of hold time
460-156138-1	IP_16-2	Methylene Chloride	2.5	-	U	MB contamination
460-156138-1	IP_16-2	Total Antimony	-	-	J-	MB contamination
460-156138-1	IP_16-2	Total Cobalt	50	-	U	MB contamination
460-156138-1	IP_16-2	Total Mercury	-	-	J-	Analyzed outside of hold time
460-156138-1	MP-16-01	Acetone	5	-	U	RB contamination
460-156138-1	MP-16-01	Carbon Disulfide	0.5	-	U	RB contamination
460-156138-1	MP-16-01	Dissolved Chromium	10	-	U	RB contamination
460-156138-1	MP-16-01	Dissolved Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-01	Dissolved Zinc	60	-	U	RB contamination
460-156138-1	MP-16-01	Ferric Iron	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-01	Ferrous Iron	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-01	Total Antimony	-	-	UJ	MB contamination
460-156138-1	MP-16-01	Total Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-02	1,1,2,2-Tetrachloroethane	-	-	R	Surrogate recoveries less than 10%
460-156138-1	MP-16-02	1,1-Dichloroethane	-	-	J-	Surrogate recoveries less than 10%
460-156138-1	MP-16-02	1,2-Dibromo-3-chloropropane	-	-	R	Surrogate recoveries less than 10%
460-156138-1	MP-16-02	2-Butanone	-	-	J-	Surrogate recoveries below QC criteria
460-156138-1	MP-16-02	2-Hexanone	-	-	J-	Surrogate recoveries below QC criteria
460-156138-1	MP-16-02	4-Methyl-2-pentanone	-	-	UJ	Surrogate recoveries below QC criteria
460-156138-1	MP-16-02	Acetone	-	-	J-	Surrogate recoveries below QC criteria
460-156138-1	MP-16-02	Bromochloromethane	-	-	R	Surrogate recoveries less than 10%
460-156138-1	MP-16-02	Bromoform	-	-	R	Surrogate recoveries less than 10%
460-156138-1	MP-16-02	Chloroform	-	-	J-	Surrogate recoveries less than 10%
460-156138-1	MP-16-02	Dibromochloromethane	-	-	R	Surrogate recoveries less than 10%
460-156138-1	MP-16-02	Dissolved Calcium	5000	-	U	RB contamination
460-156138-1	MP-16-02	Dissolved Chromium	10	-	U	RB contamination
460-156138-1	MP-16-02	Dissolved Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-02	Dissolved Zinc	60	-	U	RB contamination
460-156138-1	MP-16-02	Ferric Iron	-	-	UJ	Analyzed outside of hold time

Created by: MDS 8/14/18

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**DATA QUALIFIER SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

SDG	Field ID	Analyte	New Result	New CRQL	Qual	Comments
460-156138-1	MP-16-02	Ferrous Iron	-	-	J	Analyzed outside of hold time
460-156138-1	MP-16-02	Methylene Chloride	0.5	-	U	MB and SB contamination
460-156138-1	MP-16-02	Total Silver	10	-	U	MB contamination
460-156138-1	MP-16-02	Total Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-03	Acetone	5	-	U	RB contamination
460-156138-1	MP-16-03	Dissolved Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-03	Dissolved Potassium	5000	-	U	RB contamination
460-156138-1	MP-16-03	Dissolved Zinc	60	-	U	RB contamination
460-156138-1	MP-16-03	Ferric Iron	-	-	J	Analyzed outside of hold time
460-156138-1	MP-16-03	Ferrous Iron	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-03	Sulfate	-	-	J-	MSD recovery below QC criteria
460-156138-1	MP-16-03	Total Arsenic	10	-	U	MB contamination
460-156138-1	MP-16-03	Total Chromium	10	-	U	RB contamination
460-156138-1	MP-16-03	Total Cobalt	50	-	U	MB contamination
460-156138-1	MP-16-03	Total Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MP-16-03	Total Potassium	5000	-	U	RB contamination
460-156138-1	MP-16-03	Total Silver	10	-	U	MB contamination
460-156138-1	MW-21D	1,1,1-Trichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,1,2,2-Tetrachloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,1,2-Trichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,1-Dichloroethane	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21D	1,1-Dichloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,2,3-Trichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,2,4-Trichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,2-Dibromo-3-chloropropane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,2-Dibromoethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,2-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,2-Dichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,2-Dichloropropane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,3-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,4-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	1,4-Dioxane	-	-	J	Field Duplicate RPD above QC criteria
460-156138-1	MW-21D	2-Butanone	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	2-Hexanone	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	4-Methyl-2-pentanone	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Acetone	130	-	R	Analyzed outside of hold time; TB contamination
460-156138-1	MW-21D	Benzene	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21D	Bromochloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Bromodichloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Bromoform	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Bromomethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Carbon Disulfide	13	-	R	Analyzed outside of hold time; TB and MB contamination
460-156138-1	MW-21D	Carbon Tetrachloride	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Chlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Chloroethane	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21D	Chloroform	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Chloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	cis-1,2-Dichloroethene	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21D	cis-1,3-Dichloropropene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Cyclohexane	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21D	Dibromochloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Dichlorodifluoromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Dissolved Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-21D	Ethylbenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Ferric Iron	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21D	Ferrous Iron	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-21D	Freon 113	-	-	R	Analyzed outside of hold time

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**DATA QUALIFIER SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

SDG	Field ID	Analyte	New Result	New CRQL	Qual	Comments
460-156138-1	MW-21D	Isopropylbenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	m,p-Xylenes	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Methyl Acetate	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Methyl Cyclohexane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Methyl tert-Butyl Ether	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Methylene Chloride	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	o-Xylene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Styrene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Sulfate	-	-	J	MSD recovery below QC criteria; Field Duplicate RPD above QC criteria
460-156138-1	MW-21D	Tetrachloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Toluene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Total Antimony	-	-	UJ	MB contamination
460-156138-1	MW-21D	Total Chromium	10	-	U	MB contamination
460-156138-1	MW-21D	Total Cobalt	50	-	U	MB contamination
460-156138-1	MW-21D	Total Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-21D	Total Nickel	-	-	J	Field Duplicate RPD above QC criteria
460-156138-1	MW-21D	trans-1,2-Dichloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	trans-1,3-Dichloropropene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Trichloroethene	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21D	Trichlorofluoromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-21D	Vinyl Chloride	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21R	Acetone	5	-	U	RB contamination
460-156138-1	MW-21R	Dissolved Chromium	10	-	U	RB contamination
460-156138-1	MW-21R	Dissolved Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-21R	Dissolved Potassium	5000	-	U	RB contamination
460-156138-1	MW-21R	Dissolved Zinc	60	-	U	RB contamination
460-156138-1	MW-21R	Ferric Iron	-	-	J	Analyzed outside of hold time
460-156138-1	MW-21R	Ferrous Iron	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-21R	Total Antimony	-	-	UJ	MB contamination
460-156138-1	MW-21R	Total Cobalt	50	-	U	MB contamination
460-156138-1	MW-21R	Total Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-21R	Total Organic Carbon	1	-	U	RB contamination
460-156138-1	MW-21R	Total Potassium	5000	-	U	RB contamination
460-156138-1	MW-22D	1,1,1-Trichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,1,2,2-Tetrachloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,1,2-Trichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,1-Dichloroethane	-	-	J	Analyzed outside of hold time
460-156138-1	MW-22D	1,1-Dichloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,2,3-Trichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,2,4-Trichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,2-Dibromo-3-chloropropane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,2-Dibromoethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,2-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,2-Dichloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,2-Dichloropropane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,3-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	1,4-Dichlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	2-Butanone	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	2-Hexanone	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	4-Methyl-2-pentanone	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Acetone	-	5.9	R	Analyzed outside of hold time; TB contamination
460-156138-1	MW-22D	Benzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Bromochloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Bromodichloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Bromoform	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Bromomethane	-	-	R	Analyzed outside of hold time

Created by: MDS 8/14/18

Checked by: AMZ 8/15/18

**DATA QUALIFIER SUMMARY
JULY 2017 - MAY 2018 FIELD SAMPLING
216 PATERSON PLANK ROAD SITE
CARLSTADT, NEW JERSEY**

SDG	Field ID	Analyte	New Result	New CRQL	Qual	Comments
460-156138-1	MW-22D	Carbon Disulfide	0.5	-	R	Analyzed outside of hold time; TB and MB contamination
460-156138-1	MW-22D	Carbon Tetrachloride	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Chlorobenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Chloroethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Chloroform	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Chloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	cis-1,2-Dichloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	cis-1,3-Dichloropropene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Cyclohexane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Dibromochloromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Dichlorodifluoromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Dissolved Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-22D	Ethylbenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Ferric Iron	-	-	J	Analyzed outside of hold time
460-156138-1	MW-22D	Ferrous Iron	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-22D	Freon 113	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Isopropylbenzene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	m,p-Xylenes	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Methyl Acetate	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Methyl Cyclohexane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Methyl tert-Butyl Ether	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Methylene Chloride	0.5	-	U	TB contamination
460-156138-1	MW-22D	o-Xylene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Styrene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Sulfate	-	-	J-	MSD recovery below QC criteria
460-156138-1	MW-22D	Tetrachloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Toluene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Total Antimony	-	-	UJ	MB contamination
460-156138-1	MW-22D	Total Mercury	-	-	UJ	Analyzed outside of hold time
460-156138-1	MW-22D	trans-1,2-Dichloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	trans-1,3-Dichloropropene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Trichloroethene	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Trichlorofluoromethane	-	-	R	Analyzed outside of hold time
460-156138-1	MW-22D	Vinyl Chloride	-	-	R	Analyzed outside of hold time

Abbreviations:

CRQL - Contract Required Quantitation Limit
 LCS/LCSD - Laboratory Control Sample/Laboratory Control Sample Duplicate
 MB - Method Blank
 MS/MSD - Matrix Spike/Matrix Spike Duplicate
 QC - Quality Control
 QC - Quality Control
 QUAL - Qualifier
 RB - Rinsate Blank
 RPD - Relative Percent Difference
 RRF - Relative Response Factor
 SB - Storage Blank
 TB - Trip Blank
 TOC - Total Organic Carbon
 VOCs - Volatile Organic Compounds

Qualifiers:

J = Estimated result
 U = Not detected above CRQL
 J+ = Estimated result, biased high
 J- = Estimated result, biased low
 R = Rejected result
 UJ = Not detected above CRQL, CRQL is estimated

APPENDIX C

USEPA EDD (on CD)



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